

AGRICULTURAL

Chemicals

IN THIS ISSUE:

**A REVIEW OF RECENT
DEVELOPMENTS IN
PROCESSING, BLENDING,
HANDLING, CRUSHING,
APPLICATION EQUIPMENT**

Round Table Program

Gypsy Moth Control

New Spencer Center ➔

World Fertilizer Market

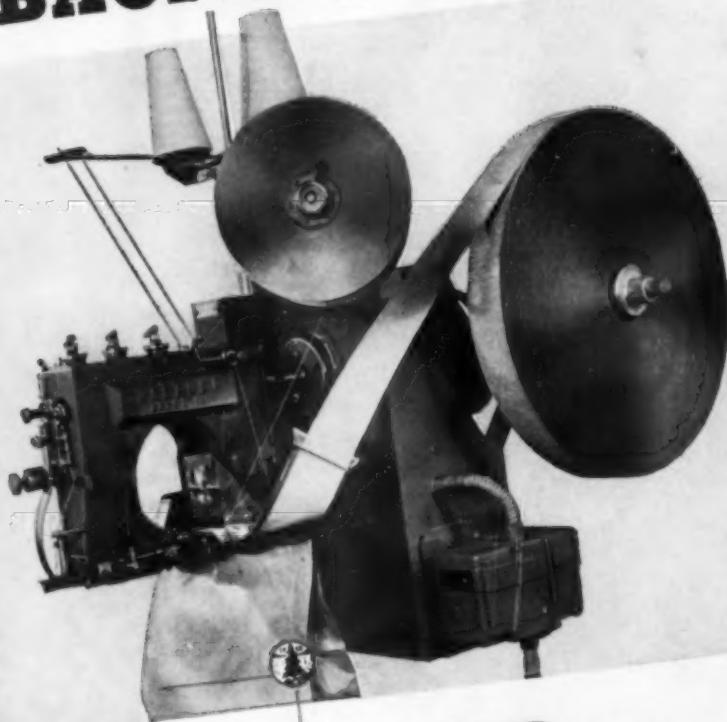
Fluid Grinding Mills

NOVEMBER, 1957



Send NOW for your copy of this NEW Book!

THE LATEST AND MOST VERSATILE BAGPAK. CLOSER



International Paper COMPANY
BAGPAK DIVISION 220 EAST 42ND STREET, NEW YORK 17, N. Y.

BRANCH OFFICES: Atlanta • Baltimore • Boston • Camden • Chicago • Cincinnati • Cleveland • Dallas • Denver • Kansas City, Kansas
Los Angeles • Minneapolis • New Orleans • Philadelphia • San Francisco • San Jose • St. Louis

This brochure gives inside details of the sensational, new bag closing machines just introduced by the BAGPAK DIVISION of International Paper. (Orders coming in from all over the U.S.!)

Write for your copy today—or send in this coupon.

Bagpak Division, International Paper Company
220 East 42nd St., New York 17, N. Y.

Please send me copy of your New Bagpak® Closer Brochure. I understand there is no obligation involved.

Name

Company

Address

AC-11

GIANT SERVANT OF AGRICULTURE

Use the Best!

One source to supply your
present day Potash requirements.

New 60% Standard Muriate
New 60% Special Granular Muriate
New 60% Coarse Granular Muriate
Sulphate of Potash
Chemical Muriate—99.9% KCl minimum

Quick Service — High Quality
Phone, write, telex, or wire us.
Phone STerling 3-4990, Washington
TWX No. - WA-331



POTASH COMPANY OF AMERICA CARLSBAD, NEW MEXICO.

General Sales Office . . . 1625 Eye Street, N.W., Washington, D.C.
Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.
Southern Sales Office . . . Candler Building, Atlanta, Ga.

YOU CAN RELY ON



VELSICOL
AGRICULTURAL CHEMICALS

*to lead the parade
to bigger sales and profits
in 1958!*

**NEW!
GIBBERELLINS!**



The amazing, widely publicized plant growth stimulant! A new product with a big profit-potential!

HEPTACHLOR

America's leading soil insecticide! Also effective for controlling many foliage insects and cotton insects.

CHLORDANE

First in household, lawn, and garden insect control for over eleven years! Backed by an unmatched record of versatility, safety, and proven effectiveness!

ENDRIN

A specialized agricultural insecticide particularly effective in control of boll weevils and boll worms on cotton, and hornworms, budworms, and flea beetles on tobacco.

**PARATHION and
METHYL PARATHION**

Parathion is widely used on fruits, cotton, small grains, and vegetables for mite and aphid control; methyl parathion in control of resistant boll weevils and mites and aphids on cotton and other crops.



**NOW! GET SET FOR RECORD SALES IN 1958!
WRITE TODAY FOR A COMPLETE INFORMATION FILE ON THESE PRODUCTS!**

VELSICOL CHEMICAL CORPORATION
330 East Grand Ave., Chicago 11, Illinois

AGRICULTURAL CHEMICALS

This Month's Cover

Spencer Chemical Co. dedicates new research center in suburban Kansas City. Top photo shows overall view of new building. Lower photos show views of the library and a typical conference room. See story on page 39.

Vol. 12, No. 11

November, 1957

AGRICULTURAL

Chemicals

ARTICLES

FERTILIZER, PESTICIDE CONTROL OFFICIALS DISCUSS STATUS OF GROWTH STIMULANTS	28
WORLD FERTILIZER MARKET	30
30 INDUSTRY REPRESENTATIVES TO LEAD DISCUSSIONS AT FERTILIZER ROUND TABLE	31
LET'S LOOK AT THE GYPSY MOTH PROBLEM	33
<i>By E. D. Burgess</i>	
NATIONAL FERTILIZER SOLUTIONS ASSOCIATION PROGRAM	36
FLUID GRINDING	37
<i>By J. P. McKenna and N. N. Stephanoff</i>	
SPENCER DEDICATES NEW RESEARCH CENTER	39
A REVIEW OF PROCESSING, HANDLING APPLICATION EQUIPMENT	40

FEATURES

IN THE SPOTLIGHT THIS MONTH	7
INDUSTRY CALENDAR	7
EDITORIALS	27
FERTILIZER VIEWS AND NEWS	52
THE LISTENING POST	57
<i>By Kelvin Dorward and Paul Miller</i>	
WASHINGTON REPORT	62
<i>By Donald Lerch</i>	
INDUSTRY NEWS	67
SUPPLIERS' BULLETINS	
PROFESSIONAL DIRECTORY	110
CLASSIFIED ADVERTISING	111
ADVERTISER'S INDEX	113
TALE ENDS	119

Publisher
Wayne E. Dorland

Editor
Eleonore Kanar

Associate Editor
Richard McNally

Advertising Manager
Ralph Dorland

Eastern District Manager
Roger Appleby

Midwestern Manager
Robert F. Garty

Circulation Manager
David Tryon

Editorial Advisory Board
Dr. Alvin J. Cox
Lea S. Hitchner
Dr. S. E. A. McCallan
Dr. Charles Palm
Dr. Colin W. Whittaker



PUBLISHED monthly on the 1st, by Industry Publications, Inc.

ADVERTISING and Editorial Office, P. O. Box 31, Caldwell, New Jersey.

PUBLICATION OFFICE: 123 Market Pl., Baltimore, Md.
CHICAGO ADDRESS: P. O. Box 126, Park Forest, Ill. SKYline 6-4499.

ENTERED as second-class matter November 4, 1949 at the Post Office at Baltimore, Md., under the Act of March 3, 1879.

SUBSCRIPTION RATES: United States, 1 year, \$5.00; 2 years, \$9.00. Canada and Pan American countries,

1 year, \$4.00; 2 years, \$7.00. All other foreign countries, 1 year, \$9.00; 2 years, \$15.

SINGLE COPIES: current issue: \$0.50; all back numbers \$1.00. Postage and handling charges for foreign countries on single copies: \$1.00. Claims for missing numbers will not be allowed if received more than 60 days from date of mailing. No claims allowed from subscribers arising from failure to notify the Circulation department of a change of address, or because a copy is "missing from files."

ADVERTISING RATES known on request. Closing date for copy—5th of month preceding month of issue.

FIRST check with NATIONAL POTASH

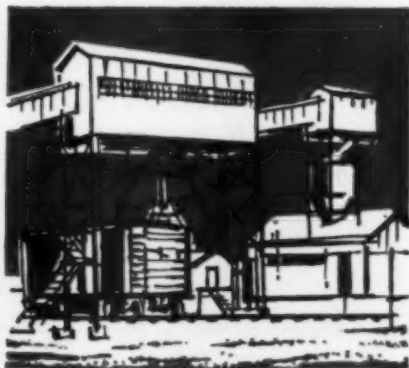
Manufacturers of fertilizer can depend on NATIONAL POTASH for a coarse and standard grade muriate of potash.

● **DUSTLESS**

● **FREE-FLOWING**

● **UNIFORM K₂O**

Ample stocks and extensive storage and shipping facilities assure you of prompt delivery of both bulk and bagged potash even during the peak fertilizer season. In addition NATIONAL POTASH offers a Free Technical Service to aid fertilizer manufacturers. *Telephone, wire or write us today.*



NATIONAL POTASH COMPANY

205 EAST 42nd ST. • NEW YORK 17, N. Y. • OREGON 9-4950
212 Bell Building • MONTGOMERY, ALA. • AMHERST 5-8234

Industry Meeting Calendar

Nov. 3-5—California Fertilizer Association, St. Francis Hotel, San Francisco, Calif.

Nov. 6-8—Fertilizer Industry Round Table, Sheraton Park Hotel, at Washington, D. C.

Nov. 12-13—Wyoming Weed & Pest Control Conf. Cody Auditorium, Cody, Wyo.

Nov. 13-15 — National Aviation Trades Assn. Hotel Adolphus, Dallas, Tex.

Nov. 14-15—Oregon Weed Conference, Withycombe, Oregon State College, Corvallis, Ore.

Nov. 17-19—National Fertilizer Solutions Assn., Netherland-Hilton Hotel, Cincinnati, Ohio.

Nov. 18-20 — Carolinas - Virginia Pesticide Formulators Association, Carolina Hotel, Pinehurst, N. C.

Nov. 21 — Annual Fall Meeting, New Jersey Entomological Club, New Brunswick, N. J.

Nov. 25—Eastern Branch ESA, Commodore Hotel, New York, N. Y.

Dec. 2-5—Entomological Society of America, National meeting jointly with Cotton States ESA, Hotel Peabody, Memphis, Tenn.

Dec. 2-5—Exposition of Chemical Industries, New York Coliseum, N. Y. C.

Dec. 4-6—Soil Science Society of Florida, University of Florida, Gainesville.

Dec. 3-4—Iowa State College Fertilizer Manufacturers' Conference and Fertilizer Dealers' Short Course, Ames, Iowa.

Dec. 9-12 — Chemical Specialties Manufacturers Association, Hollywood Beach Hotel, Hollywood, Fla.

Dec. 9-12—Vegetable Growers Association of America, Jung Hotel, New Orleans.

Dec. 10-12—North Central Weed Control Conference, Hotel Savory, Des Moines, Iowa.

Dec. 11-13—Agricultural Ammonia Institute, Hotel Marion, Little Rock, Ark.

Dec. 12-13—Beltwide Production Conference, including the Cotton Insect Control Conference, Peabody Hotel, Memphis, Tenn.



*In the
Spotlight
this Month*

- **Behind the Gypsy Moth Control Program** . . . USDA reports on the "behind the scenes" activity of the 1957 gypsy moth spray program; the organization, public preparation, general publicity planning etc, in the 3 million acre aerial treatment on the east coast earlier this year. Page 33.
- **Hazards in Granulation** . . . In manufacturing granular fertilizers, relatively few operators realize that the sulfuric acid should be as uniformly matched against the ammonia as should be the superphosphates. Non-balance of ingredients contributes to heat formation and possible fires. Page 52.
- **World Fertilizer Market** . . . Factors to be considered are: increased production and consumption of fertilizers in European countries;—FOA deliveries have contributed to increased fertilizer use in Far East;—Japan increases fertilizer production, may participate in supplying Asian countries. Page 30.
- **Fluid Grinding** . . . A milling process that shows promise for the production of field dusts and wettable sprays from heat-sensitive organic toxicants. Page 37.
- **What Equipment is in Use?** . . . A ten page review of equipment used in grinding, blending, drying, screening, weighing and bagging insecticides and fertilizer, plus some notes on application equipment, dust collection, screens, conveyors. Page 40.
- **Fungus Control on Pine** . . . Results of actidione treatment of blister rust trunk cankers on western white pine. Page 57.
- **Aerial Agricultural Application** . . . Planes designed for purposes having no relation to agricultural dust and spray application will have no place in agricultural aerial application in the future. They will be replaced by aircraft especially designed for agricultural work. Page 70.



MURIATE OF POTASH for the PLANT FOOD INDUSTRY

THIS symbol stands for high-grade coarse and uniform Muriate of Potash (60% K_2O minimum). Southwest Potash Corporation provides a dependable supply of HIGH-K* Muriate for the plant food industry.

*Trade Mark

Southwest Potash Corporation

41 BROADWAY • NEW YORK 6, N. Y.

Dec. 12-13—Cotton Insect Control Conference, Peabody Hotel, Memphis, Tenn.

Dec. 26—26th Exposition of Chemical Industries at the Coliseum in New York.

Jan. 4-5—Texas Fertilizer Conference, Texas A&M. College Station, Texas.

Jan. 8-10—Northeastern Weed Control Conference, Hotel New Yorker, N.Y.C.

Jan. 13-15—1958 Weed Society of America and Southern Weed Conference, Peabody Hotel, Memphis, Tenn.

Jan. 14-15—Georgia Plant Food Educational Society, Univ. of Georgia, Athens, Ga.

Jan. 21-22—North Carolina Pesticide School, N. C. State College, Raleigh.

Jan. 20-21—Alabama Association for Control of Economic Pests, State Coliseum, Montgomery, Ala.

Jan. 21-23—California Weed Conference, San Jose, Calif.

March 4-5—Western Cotton Production Conference, Hotel Cortez, El Paso, Tex.

June 15-18—National Plant Food Institute, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 25-27—Pacific Branch, Entomological Society of America, San Diego, Calif.

July 18-19 — Southwest Fertilizer Conference and Grade Hearing, Buccaneer Hotel, Galveston, Tex.



AGRICULTURAL CHEMICALS

**ANHYDROUS AMMONIA
NITROGEN SOLUTIONS
from STANDARD OIL**

Why buy from Standard?



Because 1. You get fast, reliable service.

Because 2. The plant location in Hammond, Indiana, makes it a convenient source of supply. Reserve tank cars are always ready to move out in response to your order.

Because 3. The plant has the best in rail and truck shipping connections. It's located in the midst of the world's largest rail center and highway network.

Because 4. Adequate storage and rail sidings make products available for immediate shipment. Loaded tank cars are ready for movement on call from you.

Because 5. Our new modern plant makes a full line of top-quality nitrogen products.

Because 6. Experienced representatives are on hand in all of the 23 Standard Oil offices in 15 Midwest and Rocky Mountain states. They are ready to help you at any time.

Want more information? Call any Standard Oil office. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Ill.



STANDARD OIL COMPANY
Indiana

Our plant managers all agree...

"International's Triple hits a consistent high in product quality and service"



*says A. R. Mullin,
General Manager,
Fertilizer Division
Indiana Farm Bureau
Cooperative Association*

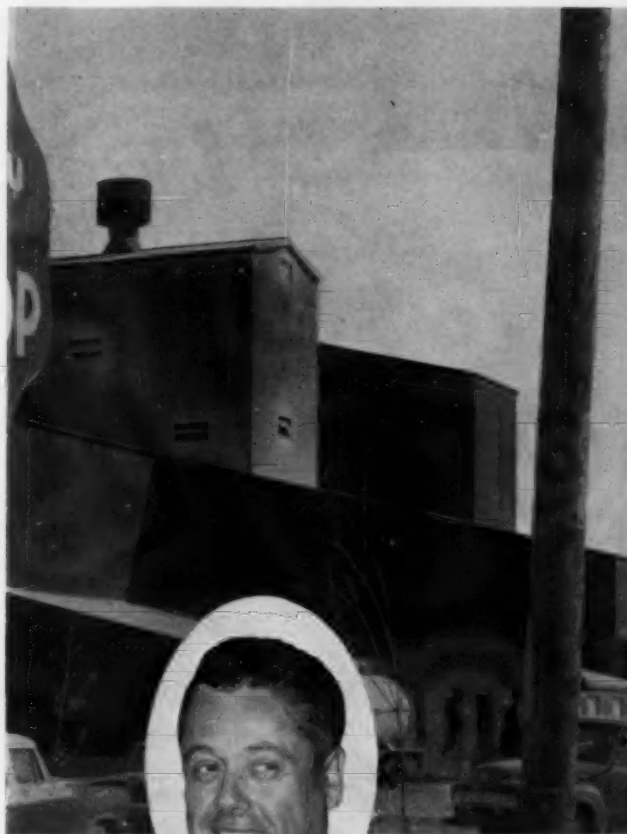


Activities at the Hartsdale
plant are directed by
William Henderson (right).



Ralph Middaugh
(right) is super-
intendent of the
Jeffersonville plant.





Robert R. Leach (left) supervises operations at the Briggs fertilizer plant.



The Indianapolis plant is managed by Plant Superintendent L. M. Leach.

Our requirements: Dependable service . . . desirable physical characteristics . . . uniformly high ammoniation and granulation results

"Basic goods get a rugged test in our fertilizer plants. And actual performance is the reason we place International's Triple Super right at the top when we figure our requirements," says A. R. Mullin, General Manager of Indiana Farm Bureau's Fertilizer Division.

Reports from the superintendents at the four modern plants (Briggs, Hartsdale, Indianapolis and Jeffersonville) show why.

International's Triple is a consistent, high quality product . . . very good for ammoniation and granulation. It has the desirable physical condition that plant people like to

see in the Triple they're using.

"What's more International has proven that they can deliver the goods when we need it," Mullin adds.

And Mullin knows whereof he speaks. He has been with the Indiana organization since 1935 . . . took charge of the Fertilizer and Seed Division in 1944.

You, too, can rely on International's superior quality product and an aggressive, stimulating outlook in service, research and product development. Write or wire for full information.

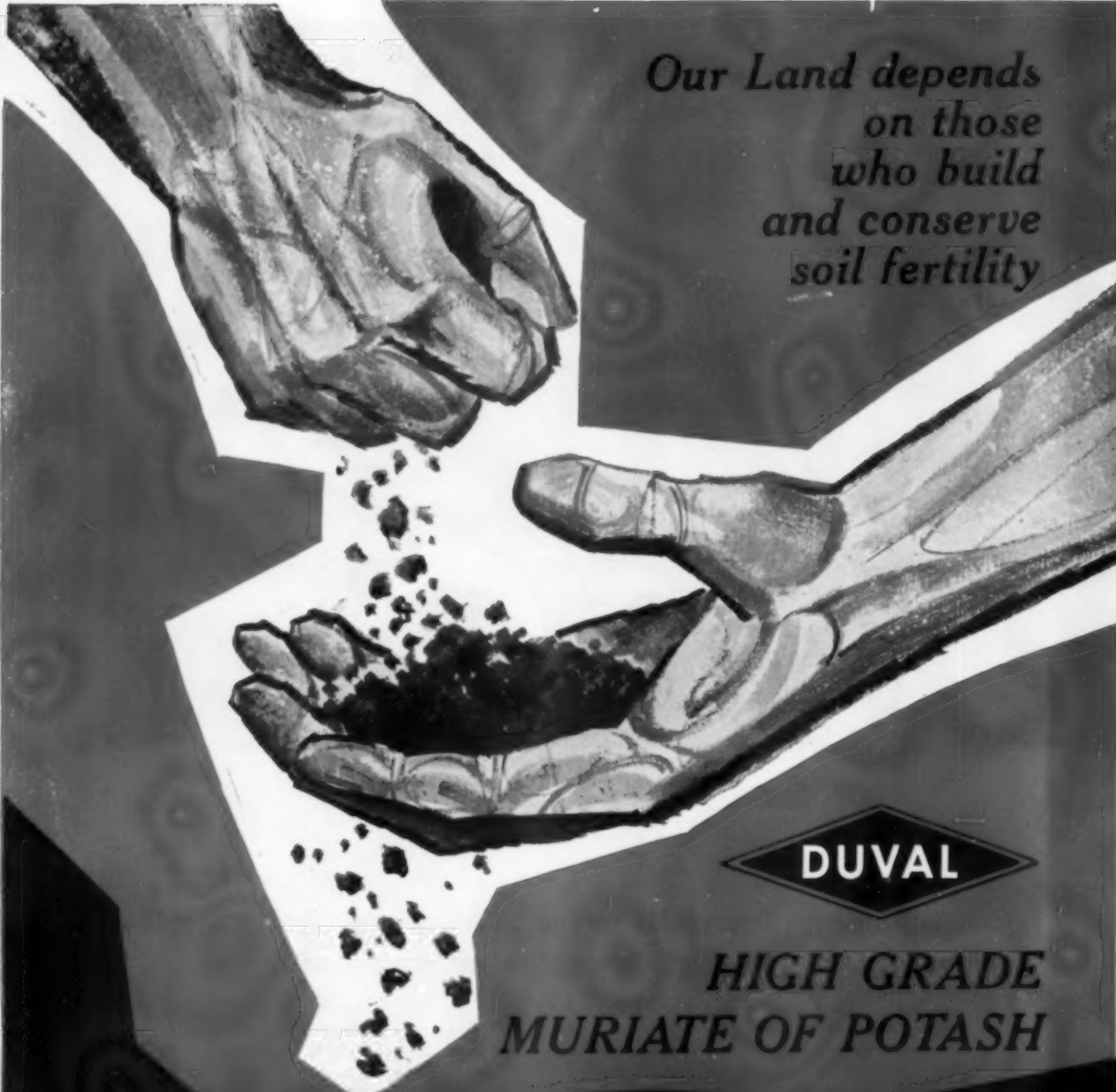
INTERNATIONAL MINERALS



& CHEMICAL CORPORATION

PHOSPHATE CHEMICALS DIVISION . . .

. . . 20 N. WACKER DRIVE, CHICAGO 6, ILL.



*Our Land depends
on those
who build
and conserve
soil fertility*

DUVAL

**HIGH GRADE
MURIATE OF POTASH**

will help do the job!

High Analysis . . . Unsurpassed Service

**DUVAL SULPHUR
and
POTASH CO.**

Modern Plant and Refinery at Carlsbad, New Mex.

Address all communications to
ASHCRAFT-WILKINSON CO.

Exclusive Distributors

ATLANTA, GEORGIA

Cable Address: Ashcraft

Roanoke, Va. Charleston, S. C. Tampa, Fla. Jackson, Miss. Columbus, Ohio Montgomery, Ala. Des Moines, Iowa

New from Sohio

the solution for granular fertilizers

SOHIOGEN 16

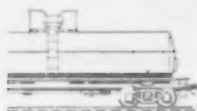
(41.4% nitrogen)

*saves up to \$1.00 per ton
in materials and manufacture*



Sohiogen 16 . . . another pace-setting Sohio solution, developed by research, to match the fast changing scene in the fertilizer industry. And it's yours with a long list of benefits for granular manufacture . . .

- ★ High fixed-to-free ratio — you can use more solution without over-ammoniation . . . require less acid neutralization.
- ★ Low salting out temperature — Sohiogen 16 is easier to handle and work with. Reduces storage problems. Low vapor pressure, too.
- ★ Produces hard granules — one size for ideal drillability, good storage. Minimum recycle ratio.
- ★ High nitrogen, low water content — reduces shipping costs, drying costs of finished goods.
- ★ Free-flowing, conditioned granules — result from perfectly adjusted Urea-Nitrate balance. Permits high solution usage with low moisture absorption of finished product.



Sohiogen 16 has been tried and proved in full-scale, multi-plant manufacturing operations. Extensive tests show it can supply all of the nitrogen for granular fertilizers up to 12% — in some instances up to 15%.

For complete details call the "Man from Sohio" . . . see how new Sohiogen 16 can make money for you.

. . . we're serious about SERVICE at Sohio



SOHIO CHEMICAL COMPANY

FT. AMANDA RD. • P. O. BOX 628 • LIMA, OHIO



TENNESSEE CORPORATION

PRIMARY PRODUCERS OF FERTILIZER CHEMICALS

Including:

- ▶ **MANGANESE SULFATE**
- ▶ **MANGANOUS OXIDE**
- ▶ **COPPER SULFATE**
- ▶ **ZINC SULFATE**
- ▶ **IRON SULFATE**
- ▶ **MINERAL MIXTURES**



*Over 30 years experience in
nutritional trace element
manufacture, research and application
to mixed fertilizers*

- YOU** are assured a consistent basic source of quality materials.
- YOU** cut costs with combined carloads from one basic source.
- YOU** can save money, time, plant space and effort through the use of our custom formula mineral mixture service.
- WE** back up our products with service, research and technical assistance.

For further information please make requests on your company's letterhead.

TENNESSEE  CORPORATION

617-629 Grant Building, Atlanta, Georgia



HERBICIDES



INSECTICIDES



WATER



SOLVENTS



**Get ahead
of your
emulsifier
problems**

with this new emulsifier team...

TOXIMULS 102 AND 103—

completely new types of agricultural emulsifiers—will emulsify both chlorinated insecticides and herbicides with great efficiency, just by blending them in correct proportions to suit your particular formulation.

Used at concentration levels of only 2-4%, this new emulsifier pair gives fast emulsification and high stability with pesticides ranging from Toxaphene or

Dieldrin to Baryl 2,4D or Isooctyl 2,4,5T.

You'll find it easy to get outstanding performance in all waters or solvents with the proper blend of TOXIMULS 102-103. Be sure of consistently good results, and less inventory problems, by putting this great new emulsifier team to work for you at once. Ask for full information without delay.

ALSO: special emulsifiers such as . . .

TOXIMUL 500 . . . easy-to-use "universal" emulsifier.

TOXIMUL MP . . . for Malathion or Parathion.

TOXIMUL 250 . . . for CIPC or Pentachlorophenol.



**Detergents—
—Emulsifiers**

**★ Write today for
samples, data sheets . . .**

SEND THIS COUPON NOW!

NINOL LABORATORIES, INC.,

DEPT. A

PRUDENTIAL PLAZA
CHICAGO 1, ILLINOIS

Gentlemen: Please send working samples of, and complete information about the TOXIMULS checked:

- ☐ 102 and 103—for chlorinated insecticides and herbicides
- ☐ 500—for "universal" applications
- ☐ MP—for Malathion or Parathion formulations
- ☐ 250—for CIPC and Pentachlorophenol formulations

Signed _____

Co. _____

Street _____

City & State _____

NINOL LABORATORIES, INC.

PRUDENTIAL PLAZA • CHICAGO 1 • PHONE WHITEHALL 4-6323

In Canada: Chemical Developments of Canada Ltd., 420 LaGauchetiere Street W., Montreal 1, Quebec



**Now...
in the heart of
the Midwest**

LOCKPORT
a vast
new source of
anhydrous ammonia
aqua ammonia
nitrogen solutions

Texaco's new Lockport plant is centered among all major rail, water and truck routes—a reliable source of ammonia and nitrogen solutions.

TEXACO LOCKPORT (ILL.) AMMONIA PLANT NOW MAKING DELIVERIES

Orders for anhydrous and aqua ammonia, and nitrogen in a variety of solutions are mounting. The advantages of doing business with Texaco Lockport are compelling:

Texaco closeness: The new ammonia plant is located right in the heart of the farm belt. Shipping distances are shorter, formulators get faster and better service.

Texaco uniformity: The Lockport plant is new from top to bottom—new processing equipment to assure product uniformity; new handling equipment; and a brand-new transport fleet to speed deliveries and protect purity in transit.

Texaco service: Texaco is famous for its service. The

Texaco man will see that your orders are handled according to instructions and that deliveries are scheduled to tie in with your operations.

For fast reliable petrochemical service, call or write The Texas Company, *Petrochemical Sales Division*, 332 South Michigan Avenue, Chicago 4, Illinois, or 135 East 42nd Street, New York 17, N. Y.



TEXACO
PETROCHEMICALS

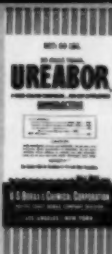
AGRICULTURAL CHEMICALS



easy ways to

destroy weeds

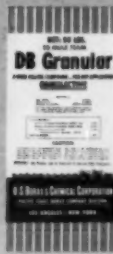
1



UREABOR®

Nonselective. A granular complex of sodium borate and substituted urea... dust-free... for DRY application. Low rates of application are a big feature. The PCB Spreader applies the low rates to best advantage and is available for \$10.75 delivered anywhere in U.S.A.

2



DB® Granular

A scientifically balanced formulation of 2,4-D and sodium borates... for DRY application. Kills deep-rooted noxious weeds—perennials and annuals—effectively and economically. The recommended low rates can be applied best with the special hand operated PCB Spreader.

(Not intended for control of grass)

3



POLYBOR-CHLORATE®

A highly soluble powder for spray or dry application. Its double action quickly destroys vegetation on contact and through root absorption. Provides long residual effects. This is a general nonselective herbicide for controlling all types of vegetation.

4



Concentrated BORASCU®

A granular concentrated sodium borate ore for nonselective control of weeds and grasses. It is easily applied, by hand or with mechanical spreaders, in its dry form. Long residual action is a feature—may prevent regrowth for a year or more.

Whether you are concerned with Agriculture or with Industry... you need **BORATE WEED KILLERS**

Weeds incur danger and great economic losses... they steal from crops... they constitute a fire hazard without equal. Nonselective BORATE weed killers attack this menace most effectively by destroying roots and rhizomes and preventing regrowth for long periods. During our lengthy experience with borates for weed control, we have developed special weed killers capable of destroying all types of weeds and grasses under the many various local and regional conditions.

YOU GET ALL THESE FEATURES:

- NONSELECTIVE HERBICIDAL ACTION
- RESULTS THAT ARE LONG-LASTING
- EASY APPLICATION AND CONVENIENCE
- EFFICIENCY AND ECONOMY
- SAFETY—Nonpoisonous, Non fire-hazardous
- WON'T CORRODE ferrous metals

AGRICULTURAL SALES DEPARTMENT
United States Borax & Chemical Corporation
PACIFIC COAST BORAX COMPANY DIVISION
630 SHATTO PLACE, LOS ANGELES 5, CALIF.



mail
this
coupon

UNITED STATES BORAX & CHEMICAL CORPORATION DEPT. AC
Pacific Coast Borax Co. Div., 630 Shatto Place, Los Angeles 5, Calif.

Please send literature on the following products:

- ☐ UREABOR® ☐ DB® Granular
☐ POLYBOR-CHLORATE® ☐ Concentrated BORASCU®

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____



YOU INCREASE PROFITS WHEN YOU USE

TRIANGLE BRAND COPPER SULPHATE

IN YOUR FUNGICIDE AND FERTILIZER FORMULATIONS

Since 1885, successful growers have preferred Triangle Brand Copper Sulphate in fungicides. It has consistently proved itself more effective and superior to organic materials; in sprays, where Bordeaux Mixture is the most reliable, or in dusts, if preferred.

In mixtures and emulsions, it is compatible with virtually every other pesticidal material. In fertilizers, it is important for enrichment of the soil and its use guarantees larger, healthier and more profitable crops. Forms of Triangle Brand Copper Sulphate available are:

INSTANT (powder) for quick and efficient mixing of Bordeaux sprays.

DIAMOND (snow) small or large crystals, all containing 25.2% metallic copper.

BASIC Copper Sulphate in powder form, containing 53% metallic copper.

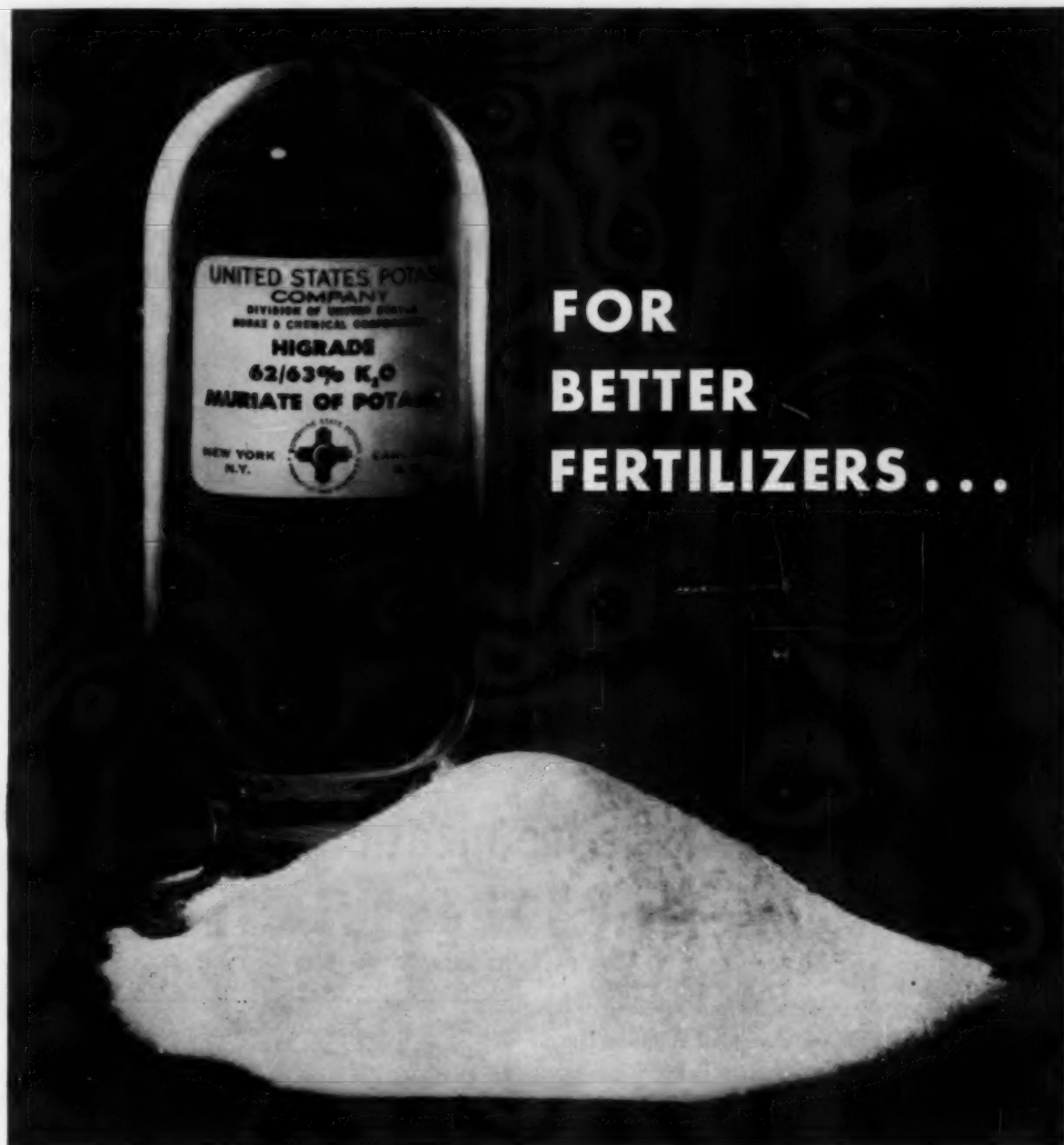
Contact us today for further information on TRIANGLE BRAND COPPER SULPHATE and its use in your agricultural formulations.

PHELPS-DODGE

REFINING CORPORATION

300 PARK AVE., NEW YORK 22, N.Y.
5310 W. 66th STREET, CHICAGO 38, ILL.





USP'S HIGRADE MURIATE OF POTASH

USP's Higrade muriate of potash (62/63% K_2O)—perfect for the manufacture of modern fertilizers. This superior white potash is non-caking and free-flowing throughout. Our Technical Service Department stands ready to answer any inquiries.

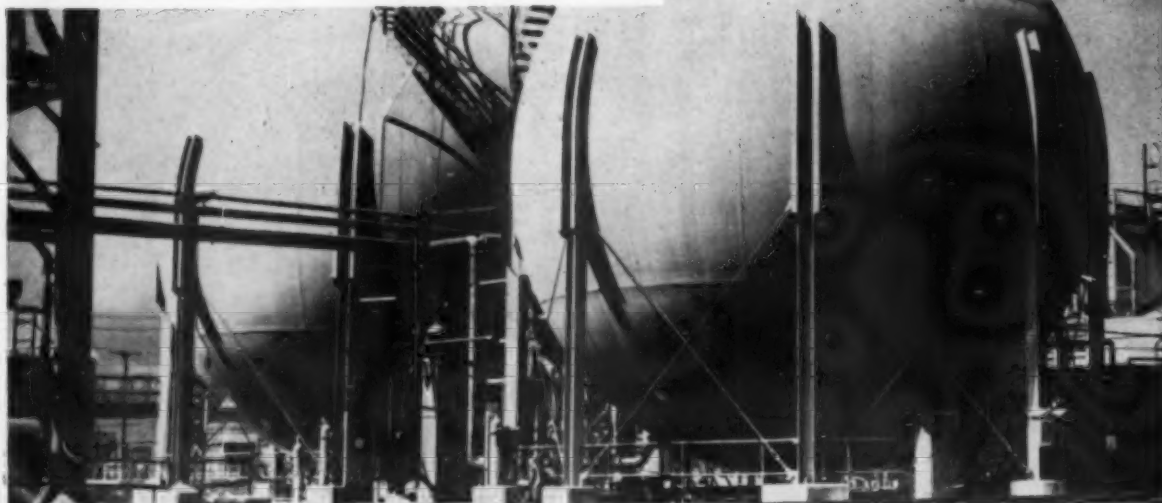
USP also offers Higrade Granular muriate of potash—62/63% K_2O —and Granular muriate of potash—60% K_2O —both free-flowing and non-caking.

UNITED STATES POTASH COMPANY
DIVISION OF UNITED STATES BORAX & CHEMICAL CORPORATION
50 Rockefeller Plaza, New York 20, New York
Southern Sales Office: Rhodes-Haverty Building, Atlanta, Georgia



MEMBER:
AMERICAN
POTASH
INSTITUTE

Now expect even better
service with **UAL**



At Du Pont's Belle Works, Belle, W. Va., spheres like these are used for storage of UAL solutions. A

continuing modernization and expansion program at Belle will further increase production and quality.

Du Pont continues modernization and expands facilities for **URAMON[®]** AMMONIA LIQUORS

Now Du Pont offers you even more dependable service with "Uramon" Ammonia Liquors. The extensive modernization program at Belle Works includes both expanded production facilities and a stepped-up research program.

Du Pont has been manufacturing urea-ammonia solutions for use in fertilizers since 1931. From this matchless background of broad experience come UAL products of outstanding dependability. For technical help and information on the "Uramon" Ammonia Liquors best suited to your mixing operations, write Du Pont.

HERE ARE OTHER IMPORTANT ADVANTAGES OF DU PONT URAMON[®] AMMONIA LIQUORS:

- High-quality nitrogen from UAL resists leaching . . . supplies both urea and ammonium forms of nitrogen.
- Safe in granulation . . . no danger of flash fires and less stack. Gives firm, uniform, stable granules, best for storage and application.
- Suitable for either batch or continuous mixing.
- Gives mixed goods better "feel"—minimizes caking, segregation and dusting.
- Won't corrode regular fertilizer manufacturing equipment, including ordinary steel and aluminum.



URAMON[®]
AMMONIA LIQUORS

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

E. I. DU PONT DE NEMOURS & CO. (INC.)
Polychemicals Department • Wilmington 58, Delaware
1616 Walnut St. 7250 N. Cicero Ave.
Philadelphia 3, Pa. Chicago 30, Ill.

Du Pont Company of Canada (1956) Limited
85 Eglinton Avenue East, Toronto 12, Ontario

PENICK SPONSORS WARFARIN CONTEST

\$1,000.00 for Best Dealer Display

PLUS

2 PRIZES OF \$500.00 EACH FOR DISTRIBUTORS' SALESMEN

This unusual contest is open to all dealers where state laws permit. It is designed to stimulate dealers' imagination in better "point-of-sale" merchandising and to simplify consumer purchasing of Warfarin, world's leading rat-killer!

Here are the simple rules:

1. Set up a store or window display with WARFARIN. No other rodenticide is to be included.
2. Keep this display up for two consecutive weeks, anytime between Nov. 1 and Dec. 15, 1957.
3. PHOTOGRAPH THE DISPLAY and mail the photograph along with your completed entry blank to:
WARFARIN CONTEST
S. B. Penick & Company
50 Church Street
New York 8, New York
4. Contest is subject to all federal, state and local regulations.
5. Entries will be judged for originality, attention value and merchandising effectiveness. In the event of ties, duplicate prizes will be awarded. The decision of the judges is final.
6. All entries become the property of S. B. Penick & Company. None will be returned.
7. All entries must be received by December 17, 1957.
8. Winners will be notified by telegram.
9. Obtain entry blanks from your distributor or write Warfarin Contest, S. B. Penick & Company.

"The World's Most-Wanted Killers"

Di-Sodium Methyl Arsonate • Dethmor® Warfarin • Pro-Noxifish® • Sulfoxide®



Agricultural Chemical and Insecticide Division

S. B. PENICK & COMPANY 50 CHURCH ST., NEW YORK 8

PENICK

735 W. DIVISION ST., CHICAGO 10



THERE'S A **BLUE VALLEY** GRANULATION UNIT ENGINEERED FOR YOUR PLANT...

Large or small . . . there's a Blue Valley Granulation unit that will produce quality granular fertilizer at the lowest cost in your plant. Important reasons why manufacturers choose Blue Valley are . . .



**BLUE VALLEY EQUIPMENT MFG.
AND ENGINEERING CO.**
LAURENT AND N. TAYLOR
TOPEKA, KANSAS

- . . . Blue Valley engineers are constantly working under actual operating conditions to provide the lowest formulation costs for their customers by using the lowest cost raw materials economically possible.
- . . . Blue Valley offers economy! Blue Valley Granulation units cost less to buy, install, and operate.
- . . . The installation of Blue Valley Granulation units does not require a major equipment change. Double screening provided to meet your requirements with a minimum of recycle.
- . . . Blue Valley offers heavy, dependable equipment for efficient operation, and with practical, visual control of the granulation process. Don't hesitate . . . investigate today!

For manufacturers merely wishing to cool and condition their fertilizers before going to storage, Blue V cooling units provide a dependable, economical, and efficient cooling operation. The cooling equipment can be incorporated into a complete granulation installation later.



TRIPLE SUPERPHOSPHATE

Phillips 66 Triple Superphosphate contains 46% available phosphoric acid. It has the physical properties essential for maximum ammoniation efficiency.

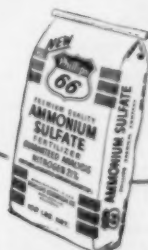


AMMONIUM NITRATE

New, free-flowing Phillips 66 Prilled Ammonium Nitrate contains 33.5% nitrogen. The small, coated prills resist caking, handle easily. Depend on Phillips 66 Prilled Ammonium Nitrate for top-notch crop response as a direct application material. It's an ideal companion high nitrogen fertilizer for your quality mixed goods.

5 PHILLIPS

Materials for the Production of Premium Fertilizers



AMMONIUM SULFATE

New premium quality Phillips 66 Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is dry-cured to remove excess moisture, prevent caking. Uniform dust-free crystals flow freely, mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.



NITROGEN SOLUTIONS

Get more N per dollar! There are seven Phillips 66 Nitrogen solutions for use in preparation of high-analysis fertilizers and the ammoniation of phosphate materials. Use these solutions to help keep manufacturing costs low; help rapid, thorough curing.



ANHYDROUS AMMONIA

Phillips 66 Agricultural Ammonia containing 82% nitrogen is a convenient, economical source of nitrogen for the formulation of mixed fertilizers. Immediate tank car shipments are assured through Phillips production facilities in the Texas Panhandle and at Adams Terminal near Houston. Phillips also has tank car pools at many key points.

PHILLIPS CHEMICAL COMPANY

A Subsidiary of Phillips Petroleum Company, Bartlesville, Oklahoma

Offices in:

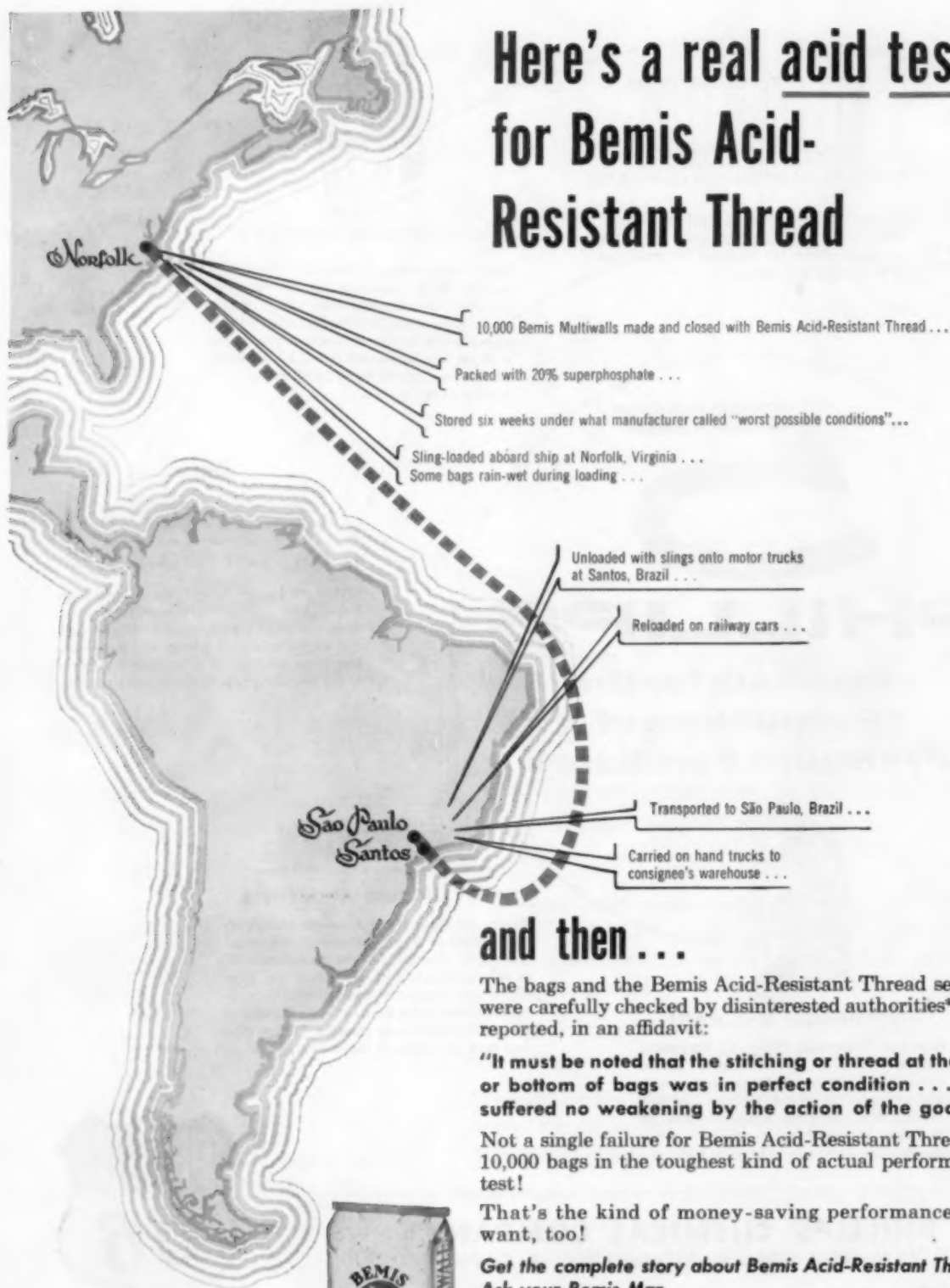
AMARILLO, TEX.—First Nat'l Bank Bldg.
ATLANTA, GA.—1428 West Peachtree St., N.W.
Station "C" P.O. Box 7313
BARTLESVILLE, OKLA.—Adams Bldg.
CHICAGO, ILL.—7 South Dearborn St.
DENVER, COLO.—1375 Kearney St.
DES MOINES, IOWA—6th Floor, Hubbell Bldg.

HOUSTON, TEX.—6910 Fannin St.
INDIANAPOLIS, IND.—1112 N. Pennsylvania St.
KANSAS CITY, MO.—500 West 39th St.
MINNEAPOLIS, MINN.—212 Sixth St. South
NEW YORK, N. Y.—80 Broadway
OMAHA, NEB.—6th Floor, WOW Building
PASADENA, CALIF.—330 Security Bldg.

RALEIGH, N. C.—401 Oberlin Road
SALT LAKE CITY, UTAH—68 South Main
SPOKANE, WASH.—531 East Sprague
ST. LOUIS, MO.—4251 Lindell Blvd.
TAMPA, FLA.—3737 Neptune St.
TULSA, OKLA.—1708 Ulva Square
WICHITA, KAN.—501 KFH Building



Here's a real acid test for Bemis Acid- Resistant Thread



Bemis



408 Pine Street, Box 66—St. Louis 2, Mo.—Sales Offices in Principal Cities

AGRICULTURAL CHEMICALS

SPECIAL FROM MONSANTO INORGANIC

One-stop source for major fertilizer nutrients



Monsanto offers you a complete range of fertilizer materials ready to be shipped to you promptly—usually just a few hours after receiving your order

It's quicker, simpler and more economical to get your quality fertilizer nutrients from Monsanto. And it's easier to work out your fertilizer production problems—our expert Technical Service Department, Research Department and Pilot Plant will help you. The Monsanto IBM 702 Electronic Computer will develop your formulations at high speed *at no cost to you*. For more information, write Monsanto Chemical Company, Inorganic Chemicals Division, Dept. AC-2, 710 N. 12th Blvd., St. Louis 1, Mo. In Canada: Monsanto Canada Ltd., Montreal.

Monsanto Inorganic . . . unfailing source of Nitrogen Solutions (Ammonia-Ammonium Nitrate-Urea Solutions), Anhydrous and Aqua Ammonia, Ammonium Nitrate, Ammonium Sulfate, Sulfuric Acid and Phosphoric Acid.



**WHERE CREATIVE CHEMISTRY
WORKS WONDERS FOR YOU**



Superphosphate Calculator simplifies your mixing problems

...it's yours, courtesy of TREBO-PHOS*

TRIPLE SUPERPHOSPHATE

A precision instrument made of heavy-gauge plastic, this Trebo-Phos Calculator tells you in seconds the proportions of single (20%) and triple super you need to fill out any mixed goods formula. Saves your time, insures accuracy. To get your free TREBO-PHOS CALCULATOR, simply write us.

The Calculator works equally well on all brands of triple and single (20%) super. Naturally, we're looking forward

to your calculating Trebo-Phos Triple Superphosphate for your mixes. We're proud of Trebo-Phos because our newly-built, ultra-modern plant produces Triple Superphosphate of superb uniformity and grade and high ammoniating quality. And, we're sure our prompt deliveries will please you.

*Trademark

CYANAMID

SAMPLE PROBLEM ... SOLVED IN SECONDS!

For a 16-20-0 mixture suppose 1195 pounds is available in each ton after supplying nitrogen materials. To find how many pounds of Triple are needed:

STEP 1. Set 1195 pounds available on "A" Scale next to 20 units on "B" Scale.

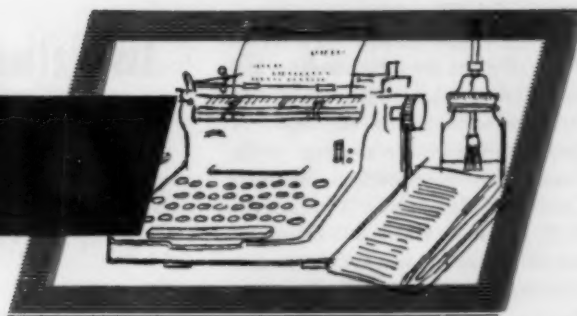
STEP 2. Opposite Pointer at "0" on "D" Scale read number pounds triple superphosphate, required on "C" Scale (Answer 619 lbs.)

STEP 3. Above 1195 (pounds available) on "C" Scale read number pounds of normal superphosphate required on "D" Scale (Answer 576 lbs.)

FOR YOUR FREE CALCULATOR WRITE:

AMERICAN CYANAMID COMPANY • PHOSPHATES DEPARTMENT • 30 ROCKEFELLER PLAZA • NEW YORK 20, N.Y. OR BREWSTER, FLA.

EDITORIALS



EVERY year when the Control Officials hold their annual meetings they come up with a series of suggestions on changes in labeling procedures, which is not at all remarkable when one considers that present labeling practices are by no means perfect, and can obviously stand improvement. For a number of years these experts have been suggesting a change in fertilizer labels so that active ingredients would be identified on an elemental rather than an oxide basis. While the suggestion has considerable merit, it is significant, we feel, that industry has not acted favorably on the suggestion to date.

Another such suggestion made at last month's Washington session was that consideration be given to changing the requirements for the active ingredient declarations for liquid pesticides, to provide that the figure of percent content be calculated on a weight/volume basis. The obvious advantage would be that the user would then be sure of applying the required amount of pesticide per gallon of diluted spray regardless of possible change in solvent, extender, etc.

The suggestion certainly has something to recommend it. However, again we have the feeling that it may be a long time before it gets beyond the discussion stage. Packagers of commercial products are loath to change their labels. They always have thousands of containers and more thousands of pieces of literature made up on the old basis, and they have learned from experience that it takes a long while before users can be conditioned to accept and understand the new label, and an even longer while before the switch-over can be made anything like one hundred percent complete. Thus we have the feeling that unless compliance is demanded by those with

the authority to ask for it, such revisions in labeling practice will be a long time in coming.

* * * * *

WITH the plant growth stimulant market rapidly showing signs of developing into big business, those marketing such products, and particularly the trade associations concerned are beginning to wonder what government agency will exercise control over these new agricultural chemical specialties. They are beginning to wonder, too, under what federal laws control will be exercised, and whether plant growth stimulants are to be considered as fertilizers or as pesticides.

Those who should have the answers tell us that these new products are clearly not fertilizers, for while they stimulate growth they have no function in plant feeding. Neither would they seem to be classifiable as insecticides or fungicides, so logically they would not come under the Miller Pesticides Amendment. As agricultural chemicals they would seem to be the concern of the USDA. Food and Drug will also have an obvious interest in how they are employed.

A joint committee of Fertilizer and Pesticide Control Officials is reported working on the subject, conferring with government agencies concerned in an attempt to reach a solution. Since the products which are reaching the market are being formulated and marketed by firms whose major business lies in the pesticide rather than the fertilizer field, it would seem logical that the governmental agencies and officials with whom they normally deal on their other products would take over control problems on the plant growth stimulants. However, we have

(Continued on Page 111)

PRODUCTION and use of "premium fertilizers," a review of plant growth stimulants and hormones, and advertising and selling fertilizer were among the topics of discussion before the meeting of the Association of American Fertilizer Control Officials in Washington, D. C., October 17-18. Of even more interest, however, was the observation of retiring president, J. D. Patterson, Oregon, that a new problem in the industry is the place of plant hormones and growth stimulants in agriculture.

In his presidential address, Mr. J. D. Patterson remarked that growth stimulants are not a source of plant food,—and cannot be considered as pesticides . . . that some new legislation may be required to define these compounds and the position of control officials with respect to these new materials. Similar comments were voiced the following day at the meeting of the Association of American Pesticide Control Officials. It was thereupon decided that the two groups should each appoint a committee of three to meet in the course of the year to discuss the question.

Commenting on the farm market, farm income, and of course fertilizer consumption, Paul T. Truitt, National Plant Food Institute, outlined the needs and opportunities in the fertilizer industry. He indicated that some part of reduced fertilizer buying is due to a decline in purchasing power of commercial farmers; but that other causes can be found in the acreage reduction brought about by

Associations of American

Pesticide Control Officials Fertilizer Control Officials

... meet at Shoreham Hotel, Washington, D. C., Oct. 17-20

government programs, and by too much or too little rainfall. After reviewing the NPFI expansion program briefly, Mr. Truitt stressed the importance of knowing what fertilizer consumption is, and urged the AAFCO to set up a special committee to perform the task of improving state consumption statistics. He requested also that consumption figures be submitted in terms of materials and grades on a more uniform basis from all the states and, at least, semi-annually.

A discussion of the "Chemical Aspects of Minor Elements in Fertilizers" was presented by Dr. R. P. Thomas, International Minerals and Chemical Corp., who stressed the advantages of a fortified quality or "premium fertilizer." "It does little good," he said, to apply fertilizers if they do not add the critical element or elements needed to increase the capacity of soils to maintain an available supply of plant foods. Good crop growth, he continued, is limited by an inadequate supply of phosphorus and calcium . . . closely associated with the inadequate supply of these two plant foods would be the nitrogen,

potassium and magnesium deficiencies.

In the production of these premium fertilizers, Dr. Thomas indicated several problems are encountered. First, since such fertilizers must always be free flowing, non-caking, and easily drillable, it often requires somewhat expensive production operations, such as special blending, additional drying, and even granulation. Fine grinding is used to maintain the desired availability of the slowly soluble trace nutrient carriers. In spite of the higher cost, premium fertilizers are here to stay observed Dr. Thomas, and are even on the increase.

Claims and guarantees have always been a problem to the fertilizer industry . . . an element or material can be added carefully to a fertilizer mix, and still not be satisfactorily detected in the end product. Dr. Thomas concluded his observations with a summation of labeling regulations, and the control officials' job in checking label claims.

Dr. Paul C. Marth, USDA, Beltsville, Md., commented on plant hormones and growth stimulants, noting that "some progress has been made in the development of new chemicals for vegetative propagation of plants that are difficult to root, others for preventing the drop of fruit at harvest; for improving fruit set; for thinning fruits that have set too heavily; for improving storage qualities; for stunting growth and producing short stocky plants . . . and the recently published property of stimulating plant growth. The success of gibberellic acid this past season, and continued investigation of this new material, have made plant growth stimulants and hormones almost synonymous with this relatively new chemical. The fact is that the general class of compounds (plant growth

Officers of the Association of American Fertilizer Control Officials: Bruce Cloaninger, re-elected secretary-treasurer; R. C. Wetherall, Bozeman, Mont., elected to the Board; F. W. Quackenbush, Lafayette, Ind., newly elected vice president; S. B. Crandle, New Brunswick, N. J., and E. E. Epps, Baton Rouge, La., both members of the executive committee; and J. D. Patterson, Salem, Ore., retiring president. J. J. Taylor, Tallahassee, Fla., (not in picture) is the new president of AAFCO.



hormones) has been in use for some time. Indole butyric acid continues to be used principally as a stem soaking treatment; naphthalene acetamide is used as a dust application to the cutting boxes . . . both of these materials have the advantage of not suppressing vegetative growth after cuttings are rooted,—such as is often found with cuttings treated with naphthalene acetic acid. This latter material, NAA, is useful in stimulating rooting plants such as yew, lilly or privet.

2,4,5-TP (trichloro phenoxyacetic acid) induces plant rooting, and advances plant maturing; maleic hydrazide retards sprouting in the storage of potatoes and onions. Ammo 16-18 (4, hydroxy 5-isopropyl, 2-methyl phenyl trimethyl ammonium chloride, 1-pyridine carboxylate) has growth stunting action which is found useful in producing short bushy plants.

Dr. J. Richard Adams, USDA, Beltsville, concentrated his remarks before the fertilizer control officials on the physical and chemical characteristics of commercial nitrogen solutions for fertilizer use. A report by Sigurd Anderson, FTC, Washington, D. C., offered some observations in connection with the advertising and sale of fertilizer.

Reports and comments before the Association of American Pesticide Control Officials included a review of nematocides in pest control; bioassay of fungicides; and an outline of the need for maintaining uniformity in precautionary labeling.

Remarks by J. G. Horsfall, Connecticut Experiment Station, concerned the question "how can we appraise the practical performance of foliage fungicides? and how can we protect the consumer from fraudulent fungicides?" The simplest test he noted, is the "active ingredient" analysis . . . thus bioassay is most important in assuring the farmer and gardener of an adequate supply of "medicines" for his plant disease satchel. On the other hand, he observed, bioassay involves its own problems.

The three basic specifications of a fungicidal protectant are: killing

power, hiding power, and staying power (tenacity). Dr. Horsfall discussed each of these properties and means of evaluation.

He observed that farmers want an "all purpose" fungus killer . . . that 60 years ago we thought we were close to an all purpose fungicide with bordeaux mixture . . . and it does have a wide spectrum of killing power. Now however, a large number of materials control certain diseases better or more easily, but none with the possible exception of zineb has as wide a spectrum of control. Farmers are beginning to accept the theory of specificity of action . . . and recognize the specific applicability of zineb or maneb for downy mildew, *Alternaria*, *Cercospor* and *Collectotrichum*; ferbam, captan, glyodin or dichlorone for apple scab; thiram for *Botrytis* or *Sclerotinia*; sulfur or Karathane for powdery mildew.

In conclusion, Dr. Horsfall discussed such factors as particle size, application rates, field and laboratory performance.

Nematocides in Pest Control

The easiest place to kill nematodes is in the soil, reported A. J. Taylor, Plant Industry Station, USDA, Beltsville, and the easiest time is when no crops are growing. Most nematodes are applied, before crop is planted, as volatile liquids which act in the vapor phase as soil fumigants.

Nematocides in general use, he reminded his audience, are toxic to plants as well as to nematodes, so time must be allowed for this effect to disappear before the crop is planted. The selection of a nematocide for any given purpose is governed largely by economic considerations. On field soil to be used for crops having a value of \$500 or more, growers find it practical to use nematocides costing \$25 to \$30 per acre . . . these same materials may be used for row fumigation of soil to be used for crops having a value of \$200 to \$300 per acre. Expense of seedbud fumigation is generally figured on the square yard basis. Cost is usually at the rate of \$2-300 per acre.

The materials currently on the market include various formulations

having: dichloropropene, ethylene dibromide or dibromochloropropene as the active ingredient. Much of the dichloropropene is a by product from the manufacture of allyl chloride or glycerine and is mixed with dichloropropene. Ethylene dibromide and dibromo chloropropene are usually diluted with naphtha, although small quantities are sold adsorbed on carriers such as attapulgite or vermiculite.

Sales of nematocides for 1957 are estimated at \$15 million, or enough to fumigate 600,000 acres.

Hazardous Substances Law

Retiring president H. J. Fisher, Connecticut Experiment Station, reported to his members the jurisdiction of the "Connecticut Hazardous Substances Law," and a similar law under consideration by the Food and Drug Administration. Dr. Fisher pointed out that the law applies only to products "intended for general or household use" . . . that chemicals used in industry are not covered; foods, drugs, cosmetics and pesticides are also excluded on the theory that in these fields the present laws are already providing sufficient safeguards.

The act is purely a labeling law, he reported, confers no authority on the enforcing agency (Food & Drug Administration) to forbid sale of the product no matter how dangerous it may be . . . provided it is labeled as the law provides.

A further report on labeling was given by James D. Kittelton, Manufacturing Chemists' Association, who discussed the need for maintaining uniformity in precautionary labeling. He discussed the labeling program of MCA and its cooperation with other trade associations, including NACA, CSMA, the U. S. Public Health Service, and USDA. He reminded his audience that three bills are now pending before the Federal Congress pertaining to labeling of hazardous substances in retail packages (S. 1900, H.R. 7388 and H.R. 9063). It may be, he concluded, that if a Federal bill is passed requiring the labeling of hazardous household substances, the States will follow suit and pass similar bills.

IN this first century of world commercial fertilizer history, there has never been a period as full of activity as the last fifteen years. Consumption and production of mineral plant nutrients rose to an extent hitherto unknown, and world trade, too, reached an unprecedented level.

The nutrient ratio (N : P₂O₅ : K₂O) has moved sharply to the benefit of nitrogen fertilizers in nearly every country. Among individual fertilizer types, the use of those with a high nutrient content has prevailed increasingly, especially in the last few years.

lizers by increasing competition. The former predominance of Western Europe, especially in the Far East is endangered. The share of Western Europe exporting countries in the total imports of this region has fallen increasingly in the past few years. This decline would certainly have been greater if the United States embargo on trade with China had been lifted.

The level of Western European exports of phosphate fertilizers remained almost unchanged in the last few years, even when compared to figures before World War II. The

Only in the production and consumption of potassium fertilizers has Eastern Germany attained prewar levels. Difficulties have arisen principally in the supply of phosphate fertilizers because of insufficient raw material imports, and also in the supply of certain types of nitrogen and potassium fertilizers as a result of excessive exports. Efforts to expand potassium production and thereby to increase exports have so far ended in failure. Years of overexploitation in the potash mines, inadequate investment and lack of manpower leave little likelihood for any large-scale increase in production in the near future.

In the last few years the Soviet Union has become one of the largest producers and consumers of commercial fertilizers. In spite of this upsurge, it has up to the present been able to supply sufficient quantities for some main crops only. For this reason, large-scale plans have been made for increase in capacity. Industry has been moved to more suitable locations and modern methods of fertilizer production have been brought into use; an improvement in the supply position has therefore already taken place.

Scarcely fifteen years were needed by the United States to develop from an import area into a net export country. This development was set in motion by the war-time drive to achieve self-sufficiency, and, in spite of the enormous increase in demand, might have fully covered the overall balance of domestic requirements in all three fertilizers by 1955. Both production and consumption have undergone basic locational readjustments in these fifteen years. Major changes have also occurred in the respective shares of individual fertilizer types in total consumption. This is particularly true of nitrogen fertilizers.

In 1956 the United States still showed import surpluses of nitrogen and potassium fertilizers. Certain foreign fertilizers, in particular Canadian synthetic nitrogen, saltpeter from Chile and potassium from Europe, have succeeded in maintaining their position on the United States

(Continued on Page 105)

The World Fertilizer Market . . .

Summary of a statistical analysis by Dr. U. Ewald, translated by A. Baade, and published in Germany. The study is reportedly based on statistics referring to the period up to the end of 1955, or the fertilizer year 1955/56.

The following changes have taken place in world trade:

- a) The traditional export surplus area for chemical fertilizers, Western Europe, has been able to retain its lead as consumer, producer and exporter; its share in the world turnover of commercial fertilizers has, however, receded as other areas, principally the United States and the Far East, have gained ground.
- b) Exports of nitrogen and potassium fertilizers from individual Western European countries have risen constantly in the last five years (1951/52 - 1955/56), an increasing portion being delivered to non-European areas.
- c) Eastern Asian countries in particular succeeded in considerably extending their imports from Western Europe, which more than offset the fall in export trade to the United States.

The efforts of Japanese and United States firms to gain additional outlets threaten Western Europe's exports of nitrogen and potassium ferti-

world-wide increase in demand for this plant nutrient was either satisfied by non-European countries with an export surplus or by the enlargement of old and the construction of new production facilities within the import areas. Thus, the external trade of individual European countries was essentially limited to areas within Europe. The determining factor for inner-European trade was the demand of certain countries for basic slag which is produced in only a few.

The Eastern European countries with their centrally controlled economies constitute a united block whose aim it is to achieve complete self-sufficiency in chemical fertilizers simultaneously with a sharp increase in consumption. In every country, extensive production planning aims at covering the rapidly growing demand, and furthermore, at exporting to the West, while at the same time reducing imports to an absolute minimum. So far, however, plans have been inadequately fulfilled, and this renders it unlikely that objectives will be reached in the appointed time. In spite of numerous difficulties, the chemical fertilizer economy of the European countries has received a remarkable impetus.



Vincent
Sauchelli
Chairman
Fertilizer
Industry
Round
Table

GROWING from a "bull session" on fertilizer production problems just eight years ago, the Fertilizer Industry Round Table, organized and headed by Dr. Vincent Sauchelli, has grown to a participating group of more than 300 members of industry and government. The 1957 meeting is scheduled for Nov. 6-8, at the Sheraton Park Hotel, Washington, D. C., and includes discussion on some 100 questions concerning various phases of fertilizer manufacture.

The organization of the 1957 program is a little different from previous meetings in that no formal reports have been requested or are scheduled for presentation. The industry representatives listed on this page will each lead discussions of several of the questions on the program, calling on persons from the audience for their comments and contributions. The program is designed to carry out the aim of the original round table meetings . . . to give plant production men and superintendents a chance to bring up production problems for discussion, and themselves report how they have solved some particular problem.

Some of the specific questions submitted by Round Table members for discussion are listed on the next page. They are grouped into five sessions of related phases of manufacture, as follows:

- I Standardizing Materials
 - Formulations
 - Chemical Control
- II Ammoniation
- III Granulation
- IV, V Manufacture of Superphosphates
 - Liquid Fertilizers
 - Instrumentation
 - Maintenance
 - Plant Effluents

FERTILIZER INDUSTRY ROUND TABLE

. . . now in session

Names of Participants

V. Sauchelli, Chairman; National Plant Food Institute, Washington, D.C.
G. F. Terman, Tennessee Valley Authority, Wilson Dam, Ala.
H. H. Tucker, Sohio Chemical, Co., Lima, Ohio
C. E. Floyd, Virginia-Carolina Chemical Co., Richmond, Va.
W. L. Hill, Agri. Res. Service, USDA, Beltsville, Md.
J. O. Hardesty, Agri. Res. Service, USDA, Beltsville, Md.
R. D. Tayloe, National Potash Co., New York, N.Y.
T. J. Bosman, Federated Chemical Co., Nashville, Tenn.
J. G. MacArthur, Spencer Chemical Co., Pittsburgh, Kan.
A. M. Smith, Olin Mathieson Chemical Co., Little Rock, Ark.
A. Spillman, Fertilizer Manufacturing Cooperative, Baltimore, Md.
W. F. Jacobi, Union Bag-Camp Paper Corp., New York, N.Y.
R. W. Lahey, Jr., Bemis Bro. Bag Co., Norfolk, Va.
F. T. Nielsson, International Minerals & Chemical Corp., Chicago
J. C. Sharp, Spencer Chemical Co., Kansas City, Mo.
A. V. Slack, Tennessee Valley Authority, Wilson Dam, Ala.
R. C. Smith, Eastern States Farmers' Exchange, W. Springfield, Mass.
T. E. Martin, U.S. Industrial Chemicals Co., Tuscola, Ill.
T. P. Hignett, Tennessee Valley Authority, Wilson Dam, Ala.
R. E. Sorensen, Cornland Plant Foods, Inc., Grinnell, Iowa
O. Seymour, Monsanto Chemical Company, Mansanto, Ill.
K. G. Clark, Agri. Res. Service, USDA, Beltsville, Md.
C. E. Waters, Allied Chemical & Dye Corp., Nitr Div., Hopewell, Va.
B. R. A. MacDonald, Potash Company of America, Carlsbad, N.M.
L. Hein, Olin Mathieson Chemical Corp., Joliet, Ill.
D. C. Kieffer, Smith-Douglass Co., Inc., Norfolk, Va.
B. E. Adams, Allied Chemical & Dye Corp., Nitr Div., Hopewell, Va.
R. Powell, Miss. River Chemical Corp., St. Louis, Mo.
G. L. Bridger, Davison Chemical Co., Div. of W. R. Grace & Co.
E. C. Perrine, Allied Chemical & Dye Corp., New York, N.Y.
V. A. Pardo, The Foxboro Company, Foxboro, Mass.
D. Chapman, International Minerals & Chem. Corp., Chicago
O. F. Jensen, E. I. du Pont de Nemours & Co., Maple City, Mich.
E. I. Lentz, Western Phosphates, Inc., Garfield, Utah
W. G. Mautner, Baugh Chemical Co., Baltimore, Md.
J. R. Myers, Eastern States Farmers' Exchange, W. Springfield, Mass.
J. E. Reynolds, Davison Chemical Co., Div. of W. R. Grace & Co.,
W. Sackett, A. J. Sackett & Sons Co., Baltimore, Md.
T. I. Horzella, Link-Belt Company, Chicago
A. E. Henderson, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.
T. R. Schmalz, F. S. Royster Guano Co., Indianapolis, Ind.
H. L. Marshall, Olin Mathieson Chemical Corp., Baltimore, Md.
R. R. Hull, Pennsalt Chemicals Corp., Philadelphia, Penn.
U. S. Jones, Olin Mathieson Chemical Co., Little Rock, Ark.

Participants—Continued

J. R. Archer, International Minerals & Chemical Corp.
A. Behler, Fischer & Porter Co.
D. O. Conrad, Eastern States Farmers' Exchange
A. S. Jackson, Fertilizer Equipment Sales Corp.
J. Markey, Tennessee Corp.
J. E. Rissman, Fluor Corp., Whittier, Calif.
T. Rogers, Barrett Div., Allied Chemical & Dye Corp.
R. B. Smith, Eastern States Farmers' Exchange
W. I. Strauss, Foxboro Co., Foxboro, Mass.
G. F. Sachsel, Battelle Memorial Institute
R. Webber, Monsanto Chemical Co.

Questions Included for Discussion

SESSION I

STANDARDIZATION, FORMULATIONS — CONTROL

Discussion limitations of sampling and analytical procedures: are present methods of analysis satisfactory for granulated fertilizers?

Any problems when using sulfate of potash for formulation with other materials for granulating?

What, if any, work has been done on use of diammonium phosphate as a base goods for the small mixer? (physical, chemical considerations)

What are the ammonium characteristics of supers (normal and triple) of different granularities?

Advantages, if any, of urea vs. ammonium nitrate solutions in ammoniation.

What are the economics in using "wet" phosphoric acid in place of furnace acid: other advantages?

Is it possible to standardize superphosphates as to: (a) fineness of particle size; (b) moisture; for granulation purposes?

Has there been any progress to report since last meeting on standardization of laboratory procedures and chemical quality control?

Have ureaforms been found suitable for use in formulations of complete goods—powdered? granulated? What specific conditions should be met to assure stability of ureaforms in fertilizer mixtures?

SESSION II

AMMONIATION

What are advantages and disadvantages of concentrated (low water content) ammoniating solutions in manufacturing non-granular fertilizers, ditto, granular?

How does one handle nitrogen solutions having high freezing points?

What are the factors influencing the ammoniation characteristics of superphosphates?

Why do we have to have so many ammoniating solutions? What is a practical basis for selection? Would it be possible to standardize the nomenclature of these various solutions?

Is there danger of a breakdown of ammonium nitrate in high-nitrogen fertilizers? Is nitrous oxide formed at 200°C?

What is the best weight of ammonia per unit of P_2O_5 in ammoniating phosphoric acid derived from either the wet process or furnace?

What are the advantages of using a granulating drum as against a pug mill for mixing and introducing solutions.

SESSION III

GRANULATION

Discuss method of successfully granulating grades of low analysis, such as low nitrogen grades prevalent in the Southeast.

Potash granules are said to act as seed in production of granules or pellets. Can other granular materials such as granulated superphosphates, or nitrogenous cem-

pounds act similarly? Any data? Relate these to the several existing processes and high and low nitrogen grades.

What data is available to show how and why different types of ammoniating solutions work better in granulating different ratios?

The analysis of granulated fertilizers made in systems using continuous feeding of solid and liquid materials often shows wide discrepancies; can these be reduced by improvements in processing and how?

Is it possible to replace say X% of triple super with "fortifiedsuper" in granulation processes? Granulation with triple does not seem to be the answer.

What influences are responsible for caking of granulated fertilizers? Particle size of raw materials, chemical composition (e.g. ammonium nitrate and urea hygroscopic fines, in the finished product? Would standardizing particle size reduce such undesirable caking?

Is it possible, economically, to use some phosphoric acid in preference to triple super in the granulation of N-K grades not requiring phosphorus? Effect on mechanical condition?

Can granulation be carried on in present equipment using nitric acid as the acidulant?

Discuss the pros and cons of using steam in granulation.

Is it possible to granulate satisfactorily P-K grades? How can it be done?

Ureaforms are being made available to the trade. Is it possible to granulate a formulation including ureaforms?

SESSION IV AND V

MFR. OF SUPERPHOSPHATES, LIQUID FERTILIZERS

Can some phosphate rock be successfully acidulated in a TVA ammoniator immediately preceding ammoniation? i.e. can freshly produced super be ammoniated directly it leaves the mixing pan? What is fume problem if this can be done? How much P_2O_5 is reverted?

What are some of the proven scrubber systems to control effluents from getting into the atmosphere? Can fumes be collected without expensive scrubbers?

What are the advantages of wet process phosphoric acid compared with furnace acid in both ammoniation and granulation?

What experience has anyone with a dust collector for hygroscopic materials? With bags plugging up with dampish dust?

Discuss or give a general evaluation of the status of liquid fertilizer (complete) projects. Any marked developments in the liquid complete fertilizer segment of our industry?

Discuss the economics of using phosphoric acid in the manufacture of complete fertilizers.

Can cost data be given relative to: Formulation vs. capital investment; total cost vs. recycle rates; rate of production vs. bulk and bag storage?

Any data from tests or experience regarding use of diammonium phosphate in the production of high-analysis goods such as 16-20-0; 6-24-24; 13-13-13; 15-15-15? Compare with phosphoric acid and ammonia; i.e. mechanical condition, carrying qualities, and so on.

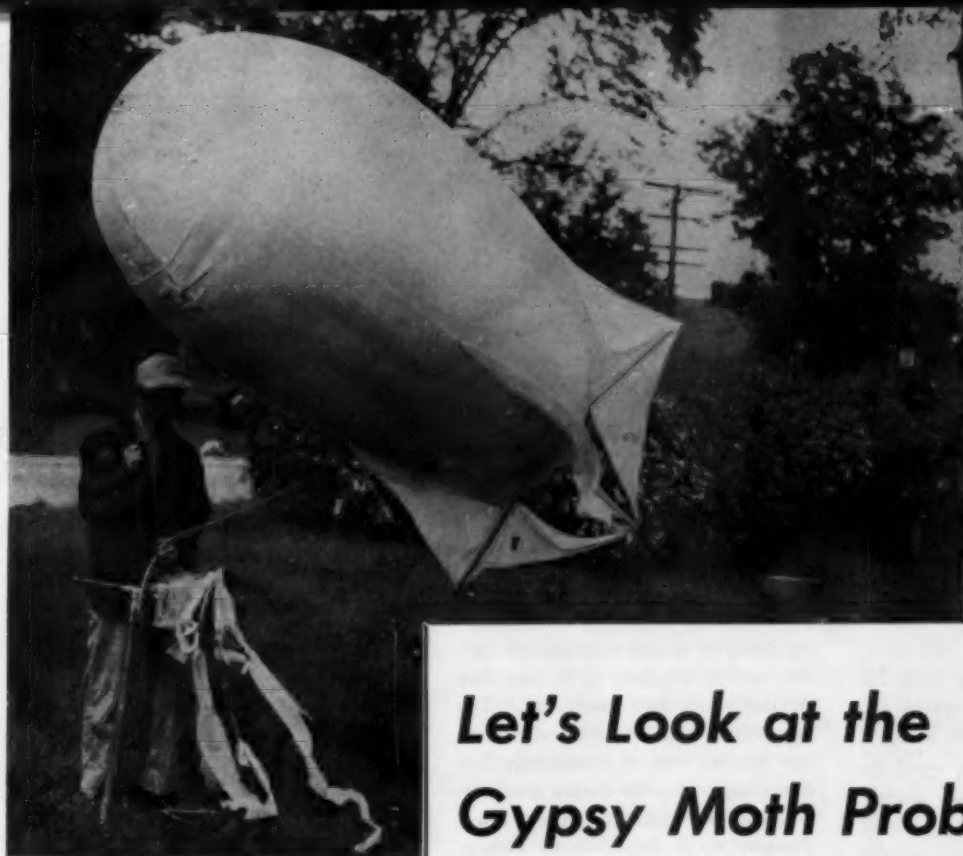
Can Uran solutions be stored safely in mild steel tanks? If yes, what inhibitors are being used?

Is it possible to use sulfate of potash like muriate "to seed" granules in granulation process?

Granule sizes influence the efficiency of sampling and subsequent chemical analysis. Can suppliers furnish classified materials, say muriate of a specified range of particle size to suit process requirements? What would be suitable mesh sizes for (a) granulation; (b) blending with other materials of same size; (c) for direct application to soil?

The ideal is to produce ultimately uniform pellets sufficiently small to dry completely by heat of reaction. Would it be practical to use a cooler large enough to permit bagging finished goods directly as it comes from

(Continued on Page 102)



Blimp-shaped balloons are raised to mark boundaries of areas to be sprayed, when other landmarks are not available. Smoke signals from Very pistols are another device used to guide the pilots of spray planes. USDA Photo.

Let's Look at the Gypsy Moth Problem

by E. D. BURGESS

Plant Pest Control Division,
Agricultural Research Service,
U. S. Department of Agriculture

SINCE before the turn of the century, scientists have been puzzling over approaches to the gypsy moth problem with a view towards bringing it within bounds, either to the point where it no longer would be destructive, or better still, to eliminate it from the United States altogether. Many years ago Professor Fernald and others felt that eradication could be accomplished with the tools then available, principally manpower, creosote, and lead arsenate or Paris green. And well it might have been,—as the area involved at that time was small and its practicability was proved later in New Jersey, where eradication was accomplished over a comparable area with but slightly improved methods. However, this did not come to pass for reasons of no import here.

Except for infestations appearing from time to time outside the everbroadening periphery of general infestation where eradication was promptly undertaken, workers continued to center their interests in

devising improved ways and means of coping with the problem. As time went by and the area involved mushroomed, attempts to prevent further spread were intensified by one device or another, and added impetus was given to introducing controls that would keep populations below the point where damage would occur. Thus, considerable attention was given to the introduction of parasites and predators, silvicultural measures, and the ever-present watchfulness for new or improved insecticides or methods of application. There probably has been no other insect problem in the history of this country that has received as much attention from both Federal and State workers as has the gypsy moth when the control, regulatory and research efforts are taken into consideration. But in spite of this tremendous effort, costs associated with it continued to soar—

the costs of control and regulatory work to say nothing of the ever-increasing damage over larger and larger areas. Federal and state agencies have for many years spent \$2 million or more annually to carry on suppressive and regulatory programs alone. As a matter of fact, prior to 1957 when the eradication program got under way, public funds amounting to considerably over \$91 million have been used on gypsy moth work since 1907. This does not include costs to individuals who have been faced with the problems of control nor the tremendous losses resulting from gypsy moth attack — those associated with the death of trees, the retardation of growth in areas of partial defoliation, the many intangible losses in real estate values, or those where injury has resulted in opening stands of timber increasing fire hazards and reducing the water-holding capacity of



the soil. All these things add up to the point where the gypsy moth has become an extremely expensive and undesirable neighbor to live with.

As the years went by until the war, there seemed to be no alternative except to continue fighting a holding action over the ever-increasing area, doing the best that could be done to confine it and continue to take the terrific annual financial beating, particularly at those times when outbreaks could be expected during a period of two to three years in every eight.

As has been repeated many times, with World War II along came DDT and its adaptability to aircraft use. It didn't take long to make extensive use of this material—not at 25 pounds to the 100 gallons applied to trees until they dripped, but at rates as low as one pound or less in a single gallon of diluent spread over an acre. It could be "misted" on foliage and do a better and more complete job. The airplane could climb mountains, a job heretofore entering into the realm of impossibility where long hose lines, powerful ground machinery and a great deal of time and energy were involved. Even the smallest aircraft could cover more infested area in a matter of minutes than spray crews previously could do in an entire season. Here seemed to be the answer to the problem of gypsy moth. For the first time in its long history it now appeared possible to

get ahead of it and treat enough area surrounding a colony to be sure that all the small fires were out. The gypsy moth could be eradicated from any specific area at a relatively low cost compared with earlier methods; it could be controlled using lower dosages, to a point where damage should no longer occur.

Before this new method could be put into practical operation however, it was necessary to determine with the help of experts in the fields of apiculture, fish and wildlife, public health and many others—what the side effects of this approach to gypsy moth control might be. Several years of exhaustive testing and observation provided the answers. Reports from reliable observers from walks of life other than that of the control entomologist clearly indicated that little, if any, even temporary injury occurred. In streams and ponds a few susceptible fish were affected, but populations were not reduced significantly, even when applications were made directly to the streams. At the dosage used, birds were not seriously injured, nor were colonies of bees even when placed in spray areas. Appreciable amounts of insecticide did not leach into streams or reservoirs.

To be effective against gypsy moth, applications must be made during the larval stages. At this period, usually between May 1 and June 15 in the northeast, other defoliators are damaging forest and shade trees,—

Photo taken in Falmouth, Mass., to show contrast between sprayed and unsprayed forest growth in area where gypsy moth infestation had reached epidemic proportions. USDA Photo.

and they, too, are vulnerable to the spray—notably tent caterpillars, elm leaf beetles and others that are troublesome to land owners. Black flies, mosquitoes, and flies are all but obliterated, at least temporarily. Most important of all, however, after a single application, the gypsy moth is no longer a problem, except under unusual circumstances. All in all aerial application and DDT looked like a "natural," a solution to the problem that has had scientists stumped for half a century.

With this new tool, major outlying infestations in Pennsylvania and Michigan were treated promptly and successfully, and suppressive work continued in eastern New York and in the New England States. During the period between 1946 and 1956, about six million acres were sprayed in this manner prior to the current eradication campaign, much of it to reduce peak populations occurring in New England. Following the greatest gypsy moth outbreak in its history, in 1953 and 1954, the gypsy moth spread from contiguous infested areas in eastern New York, Pennsylvania, and New Jersey. Infestation now embraced an additional eight million acres. With this turn of events, states not yet infested, or infested only partially, became aroused and insisted

that steps be taken to give them greater protection. Such was the problem prior to undertaking the program of eradication.

There was nothing unique about the 1957 gypsy moth eradication program. Although it was heralded to be the largest aerial spraying operation ever conducted in the United States, it was simply an extension of the principles used in forest insect control for the past 12 years. Even the size of the program was not extraordinary when compared with the Mediterranean fruit fly eradication program now nearing completion on 800,000 acres

but involving the treatment of an aggregate of 6½ million acres in Florida. To seasoned scientists, the transition from a 1-million acre program to one of 3-million acres is hardly a gamble. Yet, according to some reports, the gypsy moth work was instigated "without consultation or planning and constituted a gigantic experiment making guinea pigs of an unsuspecting population."

As is customary, the four States involved — New York, Pennsylvania, New Jersey and Michigan—worked jointly in setting up the program for the current season and the operation was planned with their full cooperation. It is known generally among State and Federal agencies that the Federal Government enters into, and performs its part in pest control programs under authority of the State involved. During the planning and advance release of publicity on the program, the States and the Federal Government worked hand in hand to unify their efforts in this respect.

It was planned that the eradication phase of the program, costing about \$3 million, should be designed to eliminate infestations from Michigan, from northern New Jersey and Pennsylvania and from sections of New York including Long Island, the Lower Hudson Valley and the Southern Catskills. Except for the isolated area in Michigan, these areas are at the periphery of the generally infested area. Separate but cooperative suppressive programs were to be conducted in other affected areas of the Northeast to prevent defoliation and cut down gypsy moth populations. These cooperative programs were supported by both State and Federal funds and were carried out as planned.

The combined efforts served as the first phase of a long-range goal to reestablish the natural barrier formed by the Berkshires and Green Mountains of New England, behind which we would be able to contain the gypsy moth over an extended time

Deteriorated condition of forest growth a few years following mortality of the trees due to repeated defoliation by the gypsy moth. USDA photo.

and ultimately to extend the operation further to completely eradicate it.

With the application of DDT distributed by aircraft, the 3-million acre eradication program in the spring of 1957, in the tri-state area was completed without serious accident using multi-engined planes with capacities of 500 to 3,000 gallons, and single engine airplanes with capacities of 75 to 150 gallons. The application of the DDT-oil solution without serious accident or incident demonstrates the experience and quality of supervision of those close to the program, and emphasizes the sound prior planning to eliminate hazards of one kind or another that exist in any spray area. In spite of the delays caused by adverse weather conditions, the spraying was completed in the period from April 22 to June 14, well within the period when the DDT was effective against the gypsy moth caterpillar.

Misapplication of insecticide and pilot error was held to a minimum by constant, careful briefing of operators, ground and aerial supervision of the program during its entire operation, and with the aid of radio communication. To forestall unwarranted complaints about contaminating property and hazard to health, a great effort was made to tell the public about the purpose of the program and the effects of sprays on plants, animals, people and property. The results of this educational program prior to the season of operation were manifested in the relatively few complaints received in this period.

The adequacy of informing the public was much greater than is generally realized. An announcement of the program with background information was distributed to all the wire services in Washington, D. C., and mailed to all the metropolitan newspapers and 126 other papers blanketing the 23 counties involved in the eradication program well in advance of its beginning. This information, plus a question and answer sheet was distributed to 55 radio stations of 5,000 watts or more. A one-minute spot news announcement, using movies, was sent to the principal

(Continued on Page 107)



National Fertilizer Solutions Association

Meets in Cincinnati, Nov. 17-19

THREE panel discussions featuring the raw material supply outlook, management, marketing, and various additives that may be incorporated in fertilizer solutions, including pesticides, chelates and the gibberellins, will be featured on the program for the annual meeting of the National Fertilizer Solutions Association, to be held at the Netherland Hilton Hotel, Cincinnati, Ohio, November 17 to 19.

Dean R. Gidney, vice-president and general manager of United States Potash Co., will discuss the potash outlook in the raw materials symposium, with H. H. Tucker, director of agricultural and technical service for Sohio Chemical Co., covering nitrogen, and W. R. Bone, manager of agricultural technical service for Monsanto Chemical Co., reviewing phosphoric acid. E. E. Crouse will serve as moderator for the raw material discussion.

The management and sales symposium will feature three faculty members of the staff of Ohio State University. Dr. John Pfahl, Department of Business Administration, will discuss "Successful Business Management," reviewing (1) Use of accounting data, (2) Sources and costs of capital for expansion, (3) Cost of credit and credit management, and (4) Profits and overhead.

"Selling A Fertility Program" will be the topic of Dr. Gordon Ryder, extension agronomist, who will discuss (1) Soil tests as a basis for starting a fertility program, (2) Is there a difference in selling a fertility program on high and low fertility soil? and (3) Factors involved in placing a complete liquid fertilizer.

Dr. John W. Sharp, grain marketing and farm supply, will cover the general topic "Marketing Fertilizers," emphasizing the four points, (1) Knowing your products, (2) Analyzing your demand, (3) Organizing a sales program, and (4) Getting acquainted with customers' needs.

C. A. Hamsher, supervisor of agricultural chemicals technical service, General Chemical Division, Allied Chemical & Dye Corp., will cover the subject of pesticides in the symposium on fertilizer additives. He will review various herbicides, insecticides and fungicides that may be applied as additives to fertilizer solutions, mentioning some of the limiting factors that must be taken into consideration, noting some of the pesticide fertilizer combinations now in use and suggesting possible future combinations that may be developed.

"The Use of Chelate Compounds in Fertilizer" will be discussed by Dr. E. J. Haertl, Agricultural Development Dept. of Dow Chemical Co., in a talk which will suggest that "the use of synthetic chelating agents in fertilizers, particularly the soluble and liquid types, is expected to become a significant factor in future developments."

Completing the additives panel will be Dr. Edwin F. Alder, plant physiologist with Lilly Research Laboratories, who will discuss gibberellic acid.

The complete program for the meeting is at right.

Netherland Hilton Hotel Cincinnati, Ohio

Sunday, Nov. 17

9:00 A.M. to 12:00 Noon

General Session on Standards

2:00 P.M. to 6:00 P.M.

Board of Directors Meeting

Monday, Nov. 18

9:30 A.M. to 12:30 P.M.

Opening General Session

Welcome to Cincinnati...Charles P. Taft, Mayor
City of Cincinnati

President's AddressE. E. Crouse

Report of Activities Committee

W. Harold Schelm
Chairman

Report of Nominating Committee

Robert B. Ellsworth
Chairman

Election of Directors

A Giant SleepsMinita Westcott

A Fistful of Future In Selling.....Ralph Everett

Tuesday, Nov. 19

9:30 A.M. to 12:00 Noon

Report of Standards Committee

Roy F. Broyhill
Chairman

RAW MATERIAL SUPPLY OUTLOOK:

PANEL DISCUSSIONE. E. Crouse
Moderator

NitrogenH. H. Tucker

Phosphoric AcidW. R. Bone

PotashDean Gidney

Successful Educational Meeting

Howard R. Lathrope, Nitrogen Div.
Allied Chem. & Dye Corp.

2:00 P.M. to 4:00 P.M.

ESSENTIALS TO SUCCESS:

Successful Business Management

Dr. John K. Pfahl

Selling A Fertility Program.....Dr. Gordon Ryder

Marketing FertilizersDr. John W. Sharp

ADDITIVES TO FERTILIZER SOLUTIONS: PANEL DISCUSSION

Robert B. Ellsworth
Moderator

Various Pesticides in Fertilizers.....C. A. Hamsher

Chelate ApplicationsDr. E. J. Haertl

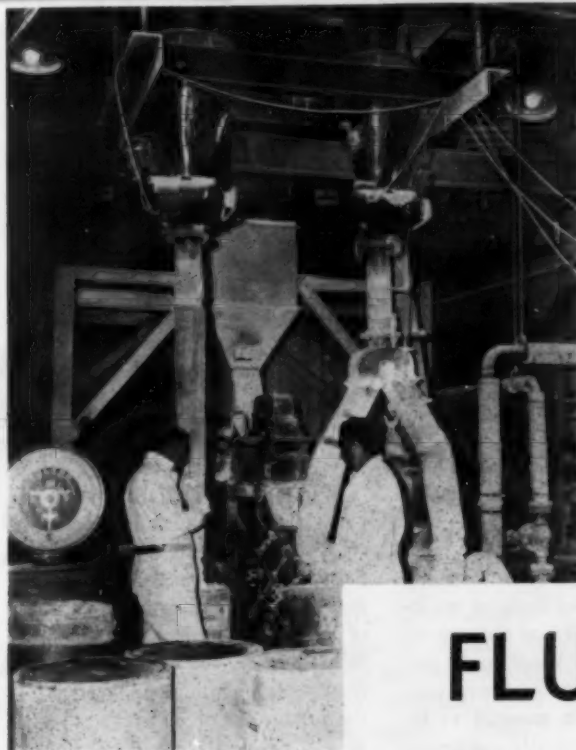
Gibberellic AcidDr. Edwin F. Alder

6:00 P.M.

Dutch Treat Cocktail Party

7:00 P.M.

Annual Dinner



A Milling Process that Shows Promise for Production of Insecticide Dusts, Sprays

by Joseph P. McKenna
and N. N. Stepanoff

Fluid Energy Processing & Equipment Co.

FLUID GRINDING

THE preparation of field dusts and sprays from various organic toxicants such as BHC, Endrin, Heptachlor, Dieldrin, Chlordane, Toxaphene and DDT presents certain difficulties in the milling operation. Most of these problems arise because of the heat-sensitivity of these materials.

Mechanical mills generate heat while grinding. This heat has a tendency to soften heat-sensitive organics, causing poor flowability during processing and making it difficult to produce finished products of correct specification. Processors faced with this problem usually must resort to relatively short mill runs, addition of dry ice or chilled intake air, which is a partial remedy for the processing trouble, but does not lend itself well either to the required uniformity of product nor economy of operation.

One answer to the preparation of these products from organic toxicants has been found in a new type mill which departs from the conventional mechanical methods, utilizing instead high velocity streams of an elastic fluid to grind particles by collision, not with the mill walls, but with one another. Thus essentially no heat is generated . . . the toxicant is

unaffected . . . there is no loss flowability. In addition the method offers other advantages beyond the solution of the problem of heat sensitivity.

How Fluid Grinding Mills Operate

WHEN two objects collide with one another with sufficient force, one or both of them break into smaller pieces. This is the underlying principle of all fluid grinding mills. The material to be pulverized is exposed to streams of fluid in the mill. This fluid, usually air or steam, is introduced through specially designed nozzles which convert the fluid energy into velocity. The solid particles, swept into violent turbulence by these streams which often reach supersonic velocities, collide and are pulverized.

Particles which are not ground to a small enough size circulate around the mill and return to the grinding zone. It is important to economy of operation then, that the maximum action be obtained in a single pass. To this end, improvements in design over the original circular cross-section of the grinding zone led to the development of a trapezoidal cross-section at this point, a configuration which concentrates the feed near the fluid nozzles, loading the streams more effectively, increasing mill wear.

Leaving the grinding zone, the fluid stream and the ground material flows to a classifying section where a combination of controlled acceleration and centrifugal force guides the oversize particles toward the wall of the mill. Finer particles in the circulating fluid as it passes the mill outlet are swept out of the mill by the viscous drag of the fluid. The larger particles due to higher inertia return to the grinding zone.

Cyclone collectors separate the fine particles from the grinding fluid after it leaves the mill. Their design is critical because micron and sub-micron particles do not handle well in an ordinary cyclone separator. When properly designed and built, one such separator will collect better than 98% of the dust, the balance being trapped in a bag collector. The product is packed directly from bins.

It should be noted that for a given production capacity, the duct work and collection system used with a fluid grinding mill is somewhat simpler and smaller than that normally required for mechanical mills. For the processor handling botanical toxicants this means a reduction in losses due to leakage of these materials which are noted for difficulty in handling.

Mill Versatility

OPERATING conditions for the mill are variable within wide limits. Grinding conditions can be varied by changing the grinding fluid, its pressure at the nozzles or by adjusting the direction of the nozzle. Modifications of feed and takeoff rates and various other minor changes permit a selection of the environment which will give the highest production rate for the product specification.

There is a marked temperature drop of the fluid as it expands at the nozzles due to the Joule-Thompson effect. This permits finer grinding by the use of higher initial temperatures without effect on heat-sensitive materials. This cooling effect more than offsets the slight attritional heat developed when grinding with compressed air at room temperature.

Normally line air pressures to the mill will be between 45 and 115 psig. For materials that can stand heat, air can be heated at 800° or steam can be used at a temperature of 550°F to 850° in the 100 to 250 psig range. Finer grinds or higher throughput are obtained with higher temperatures, since at a given pressure, increased nozzle velocities are obtained under these conditions.

Continuity of operation, besides the advantages of high production, insures uniformity, high quality product. These mills have operated for as long as a week without shutdown for clean-out when processing even high concentrations of organic toxicants. Top performance of the fluid mill depends on accurate control of all processing conditions. Adjustment of the mill is easily made, and the use of control devices at feeders, compressors and air conditioners is advantageous in maintaining the same degree of control over all other variables. Full instrumentation is readily applied.

The late-model fluid mills described above incorporate the latest design improvements in such systems. A brief history of the art of making coarse particles finer will aid in showing how this industry has progressed since its inception.

Prior to 1900 several patents were issued to various inventors,

wherein materials were entrained in a fluid jet and blasted against the walls and lid of the grinding chamber or against an anvil located in the path of the jet stream. Such action resulted in the material wearing out the anvil or wearing its way out of the chamber.

In order to eliminate this wear problem other inventors utilized the principle of two or more opposed jets with the hope that the particles would wear themselves out without wearing out the mill. But if two opposed jets are not exactly equal and precisely opposed, wear on the nozzles or casing is troublesome.

Solution to this problem was sought in the development of the stack mill, wherein the two decks of stacks were focussed radially on the axis of the impact chamber. Wear on the jets is reduced by letting the lower part of the mill fill with material to be ground, forming the nozzle and grinding chamber within the material itself. This mill was abandoned in 1935, since separation and control of fineness of grind were difficult.

In 1934 there were several attempts to locate the grinding nozzles tangentially in order to achieve controlled classification simultaneously with grinding.

The co-author of this paper, Nicholas N. Stephanoff, designed the first commercially economical fluid grinding mill in which the jets were tangentially included at an angle to the periphery of the mill to form a flat vortex with centrifugal separation; returning the coarser particles to the jets for further grinding, the fines leaving axially with the central exhaust. This construction became known as the "Micronizer."

Later, Mr. Stephanoff designed in conjunction with Kidwell, the first circuit mill which increased the efficiency of fluid grinding for both production and separation over the "pancake" or "micronizer" type mill. The present "Jet-O-Mizer" (Stephanoff Patent No. 2,590,220) Fluid Energy Mill contains further improvements explained previously, which make the Jet-O-Mizer a most efficient and ruggedly designed mill on the market.

What Characterizes a Good Field Dust Or Wettable Powder?

IN products such as this, the agricultural industry looks for a free flowing, fine particle size, homogeneous mixture of toxicant and inert. As we have mentioned, the limitations of producing such a product are bound up principally with the low melt point and gummy nature of the toxicant. The mills operating on the fluid grinding principle overcome this problem, but do they contribute anything to the other desirable qualities of the product?

There is first the matter of particle size. These mills have found ready acceptance where product particles below 5 microns average are desired, because they have that area of operation largely to themselves. What may have been overlooked though, is their fine performance in the production of materials as coarse as 325 mesh. As would be expected from what we have said above, operation at the coarse end of the grinding spectrum results in a considerable increase in output.

Current domestic specifications for wettable powders have considered the limitations of mechanical grinding methods in setting product particle size at 95% passing a 325 mesh screen, with no mention of actual average particle size in microns. However, there is a definite trend toward the type specification that requires a fineness of 4 microns or less average particle size, as typified by the World Health Organization. These specifications are based on the desirability of higher suspensibility of wettable powder in liquid sprays, particularly for use in those areas where "knapsack" spray equipment is used. It is virtually impossible to meet such specifications with mechanical grinding equipment.

For the present then, fluid processing can produce dusts and wettable powders to either specification and should the trend toward finer particle size grow, processors using these mills will be in a position of great advantage.

We might mention another line of reasoning that is likely to influence

(Continued on Page 103)

Third in a series of articles on the agricultural chemical industry's move to the suburbs.



SPENCER . . . dedicates new research center

A new research center for Spencer Chemical Company was dedicated on October 22. Located in Johnson County, Kansas in the suburban area of Kansas City, the three-level structure contains 34,000 square feet for laboratories and administrative offices.

The Center will be devoted to research and development of new and improved products in the general fields of industrial and agricultural chemicals and plastics. Its completion culminates plans envisioned for some time by Kenneth A. Spencer, president of the chemical company, and is in line with the company's policy of centralizing various company functions in Kansas City where the firm maintains its general offices.

Mr. Spencer indicated that the Center will initially house 100 to 125 personnel, about half being professionally trained chemists and engineers and the balance, technicians and clerical workers. In addition to the main administrative-laboratory building at the Center there is

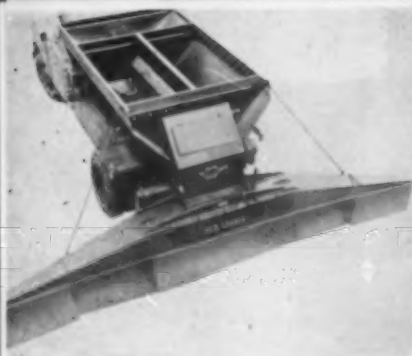
Modern equipment in the Spencer laboratories, technically trained personnel, continue Spencer's aim to lead in new and improved products.

a separate operating laboratory. Plans also call for the erection of an experimental greenhouse.

According to Mr. Spencer the 48-acre suburban site for the Research Center was chosen since it was away from the noise and confusion of industrial activity and because it offers scientific personnel the opportunity to have a rural or metropolitan home as close to their work as they wish in close relationship to schools and shopping centers. The Kansas City location makes accessible the Midwest Research Institute and the Linda Hall Library, one of the nation's large collections of technical reference material as well as other educational, technical and cultural facilities of the metropolitan area.

Architectural details of the Spencer Research Center were handled by the firms of Neville, Sharp & Simon and Mackie and Roark. Landscaping was done by Hare and Hare. Until the completion of the Center the chemical research laboratories of the company were located at Spencer's Jayhawk Works, 20 miles south of Pittsburgh, Kansas.★★





Highway Equipment Spreader



Ferti-Blast Gun



Dorr-Oliver Pan Filters

AMONG the more significant advances in the agricultural chemicals industry over the past ten years are: the trend toward use of granular pesticides, fertilizers, herbicides; increasing use of liquid fertilizers (including direct application of anhydrous ammonia); continuing increase in aerial application; and the new field of soil treatment for nematodes, etc.

The changes in physical forms of agricultural chemicals has naturally required improved application equipment, . . . and in the production of these materials, greater control, new processing units and equipment have had to be developed.

In the following pages we have compiled brief reviews on what is available for current use in agricultural equipment. The listing, we know, is probably incomplete . . . and we apologize in advance for omissions. We hope, however, to continue the review on an annual basis, and will appreciate contributions from our readers to be accumulated for the next publication in this series.

WHAT'S IN USE?

APPLICATING EQUIPMENT is being adjusted to handle a wider range of fertilizers and insecticides. In some cases, the equipment can dispense both liquid and dry fertilizers in one operation. Airplane manufacturers are coming up with craft specially designed for agricultural use and relatively inexpensive soil fumigant applicators are being offered to farmers.

AERIAL APPLICATION

Piper Duster And Sprayer

The Piper PA-18A, manufactured by the Piper Aircraft Corp., Lock Haven, Pa., has been designed to accommodate all types of liquids, dusts, fertilizers, and grains. The range of the rates of flow from the unit has increased over previous models. Low density materials can be applied at a minimum rate of one-half gallon per acre. High density materials can be applied at the maximum rate of 15 gallons per acre. Coverage is at the rate of seven acres per minute. Engine horsepower has increased to 150 and wire cutters have been installed on forward exterior surfaces. A quick-dump valve on the sprayer unit and a quick change over type unit (from dust to spray or from spray to dust) have been incorporated in the latest model. The plane uses a Lycoming

150 hp engine, can cruise at 115 mph, has a 460-mile range, and carries a useful load of 820 pounds.

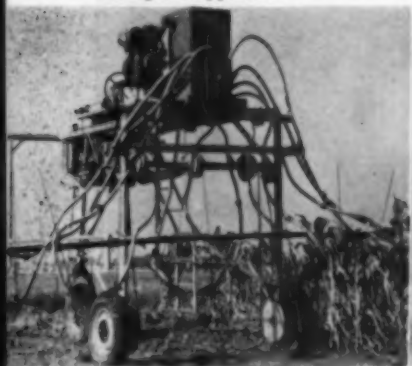
Larson D-1 Spray Plane

Larson Aero Development, Concord, Calif., manufactures the only production biplane in the medium size classification designed for agricultural use. The maximum payload is 1500 pounds. Some of the interesting features of this plane are the use of automobile wheels, tires, and brakes; war surplus engine and propeller; mid-span ailerons; and twin rudders. The fuselage is of welded chrome-moly steel tubing. The experimental model has the aft section bare of fabric, a feature which is expected to facilitate cleaning and reduce maintenance and inspection problems.

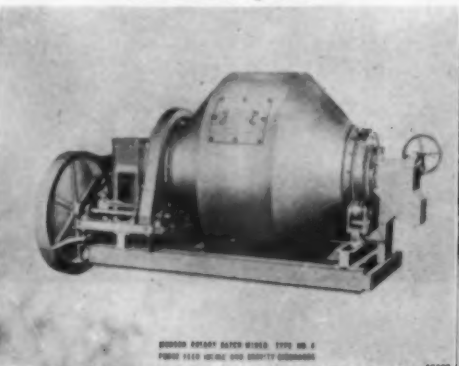
Transland AG-2 Airplane

The AG-2 farm and forest airplane is an all-metal, low wing monoplane, designed specifically for

Niagara Applicator



Munson Rotary Mixer

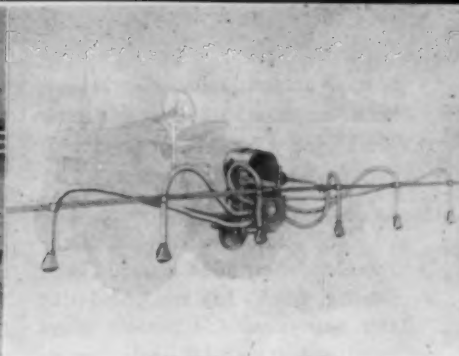


Campbell Applicator

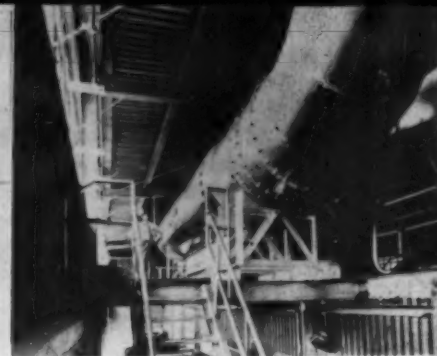




KBH Ammonia Applicator



Hudson Power Duster



Joy Dust Collector

in Equipment

maximum efficiency in all phases of aerial application. Manufactured by the Transland Co., Los Angeles, Calif., the AG-2 carries a one ton pay load and is powered by a 600 hp Pratt and Whitney R-1340 engine. It comes fully equipped and has separate systems for solids and liquids which can be controlled singly or together by the pilot in flight. A 53 cubic foot hopper holds 2,000 pounds of low-density solids and is located in the space between the engine firewall and the cockpit. Four spray tanks with a combined normal capacity of 250 gallons are located in the wings. The plane is scheduled for customer delivery in late 1957.

GROUND APPLICATION

Niagara Liqui-Duster

The Niagara Chemical Division of the Food Machinery and Chemical Corp., Middleport, N. Y., offers the Niagara Series 40, a smaller companion to the Series 60, for use in medium size or small orchards. Dusts, liqui-dusts, or spray concentrates are

applied from both sides of the compact orchard machine. A 6-cylinder engine drives a special discharge head to provide a blanket of uniform distribution. The compact design permits working under and close to tree rows.

Baughman K-5 Spreaders

The Baughman Manufacturing Co., Jerseyville, Ill., offers a series of fertilizer spreaders with a choice of three drives, three conveyors, and single or double distributors. The large, truck-size spreaders are equipped with reinforced bodies with internal bracing and extended jacks for full side support.

Century Trailer Applicator

A new trailer-type applicator for applying granular insecticides is being manufactured by the Century Engineering Corp., Cedar Rapids, Iowa. The unit has an adjustable height trailer which has a maximum clearance of 51 inches and can be quickly adjusted to lower the seeder as low as 38 inches above the ground for seeding or applying granular insecticides. The unit is operated from the tractor power take-off. The trailer permits the crop, such as corn, to be fully erect during the application of the granular insecticide even though the trailer is pulled

by a tractor of normal axle clearance.

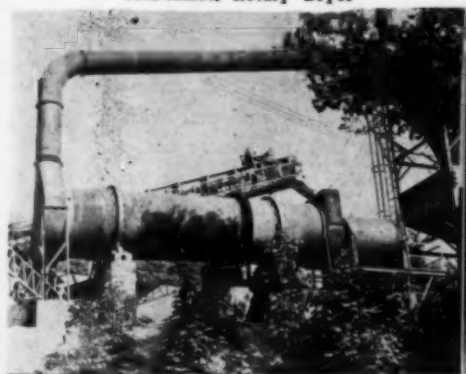
Hudson Power Duster

A new Peerless power duster line, featuring many new improvements, has been announced by the H. D. Hudson Manufacturing Co., Chicago. The new duster features a heart-shaped hopper with an improved agitator and a new feed regulator. The hopper holds about 60 pounds of dust. An all metal boom pivots to any height and a spring wire clamp holds discharge hoses in position along the boom. The duster features a simple mounting system for tractors and is available with six or four outlets. In addition to power-take-off types, engine-powered units also are available.

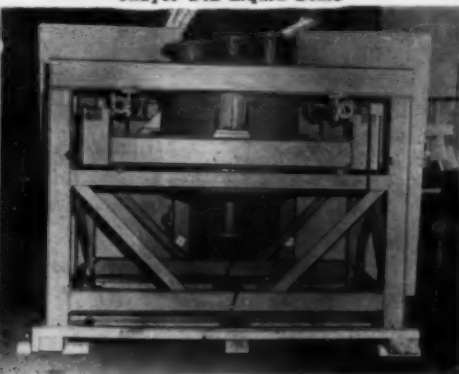
Carter Fumigant Applicator

The Carter-Matic center feed applicator kit for soil fumigation, manufactured by the Carter Insecticide & Chemical Co., Wallace, N.C., is available with any number of outlets and provides a uniform flow from the time the can or tank is full until it is empty. The applicator body is made of brass and the tubing is polyethylene. The unit is adaptable to any make of tractor and provides an economical way to accurately apply low gallonage soil

McDermott Rotary Dryer



Thayer B4L Liquid Scale



Tractomotive TL6 TractoLoader



Insect Control Fumigator

Insect Control Sales & Service Candor, N.C., manufacturers of soil fumigant applicators, are offering a pressure applicator for solid or broadcast treatment. It can be mounted on the field tiller or cultivator of any farm tractor either in front of or behind the rear wheels. It is powered by a gear pump, working from the power take-off of the tractor. The soil fumigant is transferred from a drum carried on the tractor through metering orifices to tubes attached behind narrow cultivator shanks. The "Inso Kit" contains a control unit, pump unit, orifice manifold unit, shank discharge unit, and tubing.

FM Applicator Units

Fabricated Metals, Inc., San Leandro, Calif., has developed a pair of applying units for use in soil fumigation. FM is offering a Liqui-Pump which is a ground wheel-driven liquid metering pump designed to give accurate control of the rate of flow of soil fumigants. Also, FM offers a gravity application kit which meters the flow of fumigants into the soil by varying the diameter and length of the metering tubes. The gravity kit is made of plastic and steel and contains a metering valve and vacuum breaker assuring a constant rate of application for any head setting. An attractive feature of the kit is that it sells for under \$50 to the farmer, providing a low cost method of dispensing fertilizers accurately in fifteen to 200 gallons per acre capacities.

Chapin Cart Sprayers

A new cart sprayer, being offered by the R. E. Chapin Manufacturing Works, Inc., Batavia, N.Y., is equipped with a single adjustable cone nozzle for spot spraying, and also has a two nozzle boom which attaches to a bracket on the tank for lawn spraying. The tank has a capacity of seven gallons and can be detached from the frame for cleaning or storage. The frame is heavy steel tubing and is adjustable for height. The sprayer, model 804, is equipped with an 11-foot, oil resistant

hose, an automatic shut-off, a 24 inch brass extension, an adjustable cone nozzle, and a brass boom fitted with two fan spray brass nozzles.

John Bean Hi-Crop

The John Bean Division of the Food Machinery and Chemical Corp., Lansing, Mich., has announced that two new features, adjustable wheel tread and a granular applicator attachment, have been added to the John Bean Hi-Crop and high clearance sprayers. The granular applicator, mounted in front of the Hi-Crop, a self-propelled sprayer, permits the application of both granules and liquid sprays at the same time. The adjustable wheel tread allows the farmer to match his sprayer to virtually any row width.

Standard Liquid Applicator

A completely self-contained, skid-mounted spray unit is offered by the Standard Steel Manufacturing Co., Indianapolis, Ind. The Model 5SK, a 1,000 gallon unit, contains 19 spray outlets and has a 32 foot boom coverage. It can be loaded on any flat bed truck, trailer, or wagon. The control assembly can be operated from the truck cab. The unit is available with iron or stainless steel boom and fittings and uses Spraying Systems stainless steel nozzles throughout.

Welcome Trailer Applicator

The Welcome Manufacturing Co., Welcome, Minn., manufactures a trailer-type anhydrous ammonia applicator which is equipped with a 300 gallon tank, permitting application on up to 30 acres with one fill. No special attachments are necessary on the tractor and no pump or compression is needed as it is a gravity flow applicator. The main control valve is stainless steel and the distribution valves are aluminum. An equalizing tube in front of the tank controls the pressure and assures an equal flow to all knives.

Campbell Trailer Sprayers

The Campbell Manufacturing Co., Walthill, Nebr., manufactures a heavy duty trailer for all types of spraying, weed and insect control, and surface fertilizer solution

application. The Campbell All Purpose Trailer Sprayer, Models ST & FT, are equipped with 15 inch wheels with Timken cone roller bearings. The manifold is within easy reach of the operator and no mounting is necessary. The six or eight row angle iron reinforced booms are spring protected against breakage. The sprayers can accommodate a 200 gallon oval tank or two or three 55-gallon drums.

Dempster Liquidator

The Dempster Mill Manufacturing Co., Beatrice, Nebr., has developed a combination liquid and dry fertilizing machine which can be used to apply a required quantity of balanced fertilizer directly into the soil in one complete operation. Actually a Dempster anhydrous ammonia machine with a dry fertilizing attachment, the combination can be supplied with either four, six, or eight row units. 100-pound fertilizer containers are supplied for each row and the rig can be set on 20 inch spacing or 40 inch spacing. It is adaptable to all standard three point hitch tractors.

Chewning Ferti-Blast Gun

The Chowning Regulator Corp., Corning, N.Y., has developed a "Ferti-Blast" gun for the application of pelleted fertilizers to roadside banks, slopes, and other large turf areas. Utilizing a high velocity air stream from an air compressor, the gun applies dry fertilizer pellets, pelleted seed, granular limestone, and calcium chloride at distances in excess of 75 feet from the nozzle. The gun body is of cast aluminum, the nozzle is of hardened steel with a stainless steel jet. Used in tandem, one gun shooting high and another shooting low, the guns can fertilize eight to ten acres per hour.

Smith Knapsack Sprayers

D. B. Smith & Co., Utica, N.Y., is offering a new E-Z knapsack sprayer which is equipped with a five gallon tank and can be used for most spraying needs. The tank comes in either zinc or copper and has a ventilated and form fitting back. All working parts are of brass.

AGRICULTURAL CHEMICALS

Highway Material Spreader

Highway Equipment Co., Cedar Rapids, Iowa, offers a new fertilizer spreader which spreads three fertilizer materials simultaneously. Nitrogen, phosphate, and potash are spread to the correct proportions as determined by the soil analysis of the land to be fertilized. Three feed-gates, one for each fertilizer, accurately control the proportion and amount of spread. Each fertilizer is conveyed to the spreader on separate sections of a 36 inch belt, the speed of which is synchronized to the truck speed.

Granular DDT Applicator

Noble Manufacturing Co., Sac City, Iowa, is offering an applicator for granular DDT for use in corn borer control. The applicator is a hopper-type unit engineered to drop granular DDT into the corn whorls with a minimum of waste.

VALVES and NOZZLES

Teejet Nozzles—SS Valves

Complete nozzles for boom sprayers and portable sprayers are offered in the Teejet line by Spraying Systems Co., Bellwood, Ill.

A new pressure relief valve, Model 6815, for use on farm spraying equipment, is especially suitable for fertilizer solutions. This particular model has a large internal valve area, and handles flow supply lines up to 3/4" at normal pressures. Inner rib construction of the valve body allows full flow of liquid around the shut-off piston to take place, preventing the "salting out" of fertilizer solutions. (See Advertisement p. 106.)

Grinnell Diaphragm Valves

For nitrogen solutions, and liquid fertilizer equipment in general, the Grinnell Co., Providence, offers the Grinnell-Saunders diaphragm valves. Bodies are of cast iron (plain or rubber-lined), aluminum, stainless steel; diaphragms of rubber, neoprene or other synthetics . . . designed for handling corrosive chemicals and solutions. One attractive feature is simple maintenance, since the diaphragm may be replaced without removing valve from the line . . . no refacing or reseating is necessary.

Pitzer Ammonia Valves

Squibb Taylor, Dallas, offers the Pitzer ammonia valves for handling anhydrous ammonia. They report maximum flow with minimum closing differential, indicating valves will close at tank pressures as low as 10 to 16 pounds.

WEIGHING AND BAGGING EQUIPMENT is being tailored to handle new and specialized types of fertilizer bagging brought about by an increasing demand for smaller, handy bag sizes. In addition, more stress is being placed on accuracy and speed of weighing because of the larger number of bags being filled.

International AF Bagpaker

The International Paper Co., New York, has introduced a new model of their Bagpaker. The new Model AF is a modification for specialized use of the much larger standard Bagpaker. It is highly adaptable for fertilizer, lime, feed, and similar products. The machine handles bag sizes with a face width of 15 to 16 inches; length 30 to 36 inches, with a variation of gussets according to requirements. The machine fills up to 25 bags per minute, with a filling rate instantly adjustable by means of a variable speed drive. The only physical operation is the hanging of the bag on the filling spout. The AF Bagpaker is normally equipped with three or four Hoepner automatic net weighing scales, depending on the product to be packed and the packaging rate required. (See Advertisement on Cover.)

Chase Southland Packer

The Chase Bag Co., Chicago, is offering the "Southland Packer," a completely automatic, all electric packer for open-mouth multiwall and textile bags. The packer is made from 12 gauge or heavier steel plate and requires no external bracing for rigidity. The feeder is of the continuous operating type, using a 1/2 h.p. gear-enclosed motor to operate its endless belt. Cylindrical hoppers and buckets allow a clean and complete flow of material. Parts are standardized and can be interchanged in plants where more than one packer is in use. Some unique features of the Southland Packer are its one scale system with fewer moving parts and weigh points, stainless-steel pins

Relief Valve Manifold

A pair of relief valve manifolds introduced recently by Bastian-Blessing Co., Chicago, are said to offer safety relief capacity for large anhydrous ammonia bulk storage tanks. The valves have a cast steel body, 3 ports and 3 aluminum relief valves.

and nylon bushings for durability, and a spring-suspended bag-filling spout for less spillage and dusting. (See Advertisement p. 53.)

Black Airflow Packer

The Black Products Co., Chicago, offers an "Airflow" valve bag packer designed to fill bags of from 10 to 125 pounds. A 110 volt AC power supply operates the unit. Air required ranges from four to twelve cfm, which can be supplied by any standard low capacity air compressor. The Airflow can be adapted to fill drums and pails as well as bags.

Kraft Open Mouth Packer

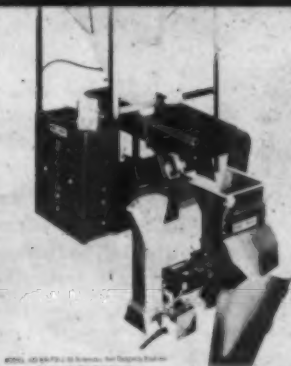
The Kraftpacker, an automatic open mouth filling machine, is designed primarily for fertilizer plants. This equipment is capable of packing any free flowing materials in the 25-200 range, and can be installed in practically any plant with a minimum of modification. The Kraft Bag Corp., New York, is exclusive sales agent for this packer. The machine is capable of operating at high speeds and will drop up to 30 charges per minute. The employment of a continually moving feed conveyor and a surge hopper cut-off assures weights to plus or minus four ounces. In addition to the standard model, which is of sturdy sheet steel construction, models are also available of stainless steel construction. (See Advertisement p. 47.)

Fulton Ful-Pac Line

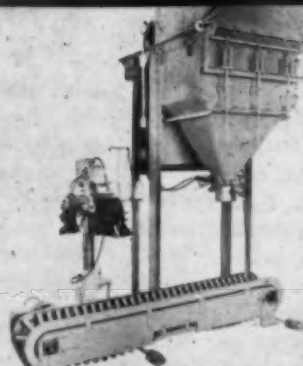
The new line of valve bag packers offered by the Fulton Bag & Cotton Mills, Atlanta, is designed to fill valve bags with powdery, granular, or bulky materials. One of



Clark Tractor Shovel



Exact Weight Model 920



Bemis Fertilizer Packer



St. Regis Packer

its key features is a removable steel jacket, which provides maximum operator safety and protects parts. The Ful-Pac line includes the F-50-V, F-50-I, and the F-50-D, the latter equipped with dual spouts. A special agitator, driven by a sealed gear reducer, and the special wide mouth hopper are engineered to insure free flow of the material being packed. Another feature of the Fulton unit is a fully-adjustable bag rest saddle. (See Advertisement p. 63.)

Union Bag Fertilizer Bagger

The Union Bag-Camp Paper Corp., New York, offers the I & C Bagger, an automatic weighing and filling machine for open mouth bags, which can pack up to twenty 100 lb. bags per minute. The bagger is manufactured by Inglett & Corley of Augusta, Ga., for whom the Union Bag Corp. is exclusive sales agent. With Model UB 100-A tolerances of plus or minus four ounces are claimed, while model UB 101-A allows for even closer tolerances, up to plus or minus two ounces per bag. The ability to use open mouth bags can result in savings up to seven or eight per cent in bag costs, the company indicates, and the open mouth bags are also better adapted to packing granulated, pelleted fertilizer than are valve bags. (See Advertisement p. 86.)

St. Regis Valve Bag Packer

The Multiwall Packaging division of the St. Regis Paper Co., New York, has designed a modern valve bag packer (161-FB) which packs bags weighing from 25 to 100 lbs. The machine fills, weighs and discharges bags automatically and a built-in settler makes the contents of the bag more compact during the filling cycle. The 161-FB works on a

continuous flow principle. A running belt feeder provides a uniform flow of material to the packer. As soon as one bag is filled an empty one is automatically shifted into position with no interruption to the material flow. Packing rates go as high as 22 bags per minute.

Thayer Combination Scale

The Thayer Scale Corp., Pembroke, Mass., is offering a combination bag and drum filling scale, Model G18R Gross Weight Filling Scale. The feeding mechanism consists of a Thayer developed rotary vane feeder with secondary closing gates to assure complete control of the product during and after the filling cycle of operation. The air operated expanding bag holder provides a dust tight seal on the bag or drum during the filling operation.

An automatic weigh lorry, Model B5X, for use as a process control batching scale is manufactured by the Thayer Scale Corp., Pembroke, Mass. The unit is a self-powered, movable weigh lorry for automatically pre-weighing, in an accumulative manner, ingredients from as many as five different overhead storage bins. Automatic indicating lights on the instrument control panel show the various cycles of operations. (See Advertisement p. 100.)

Bemis Fertilizer Packer

The Bemis Bro. Bag Co., St. Louis, offers the Bemis Fertilizer Packer in two standard models—the series 6107 with power scale feed, and series 6108 with gravity scale feed. The 6107 units are three-bucket electro-mechanical scales designed specifically to handle fertilizers with sluggish flow characteristics. The 6108 scales are also three-bucket,

electro-mechanical units designed to handle free flowing fertilizers. Either type scale will handle 50, 80, and 100 lb. multi-wall paper bags, or 100 to 200 lb. textile bags. A new attachment available on the packers is the Bemis Jetrol injector for adding liquid insecticides to fertilizer as it falls into the bag. By spraying the liquid insecticide through the fertilizer, the Jetrol diffuses it thoroughly and minimizes toxicity problems. (See Advertisement p. 24.)

Exact Weight Sacking Scale

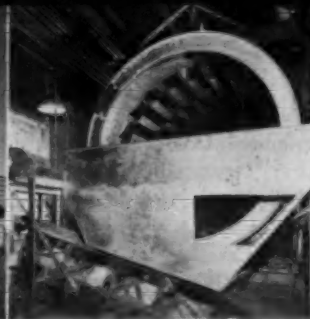
A 200 pound capacity portable, semi-automatic weighing machine for sacking and bagging directly from supply bins is offered by the Exact Weight Scale Co., Columbus, Ohio. The scale is equipped with double mercury magnetic controls for operation of an air operated valve. The valve, which can handle two rates of feed, may be mounted on several storage bins and the scale unit can be moved from one bin to another. The semi-automatic weighing machine requires the services of an operator who places the empty bag or carton on the scale commodity platter and pushes a switch to close the valve.

Richardson Bagging Scale

The Richardson Scale Co., Clifton, N.J., is offering the new HA-39 fertilizer bagging scale which is entirely automatic in operation and feeds, weighs, and bags up to 24 sacks per minute. The HA-39 consists essentially of five components—frame, chute, belt feeder with motor drive and catch gate, beam system with weigh hopper, and bagging spout. The scale is totally enclosed and dust-tight. Electrical timers provide safeguards against overloads at the catch gate. (See Advertisement p. 48.)



Transland Ag-2



Blaw Knox Cooler



Piper Ag-2



Blue Valley Ammoniator

Fischbein Portable Closer

The Dave Fischbein Co., Minneapolis, offers a portable bag closer which handles all types of bags and cars, trucks, ships, and barges. The weight of the unit is ten pounds. The company also offers a table model carriage conveyor that has one knob for locking any Fischbein portable bag closer into proper sewing position. The carriage slides freely and returns automatically to starting position.

Fry Bag Closing Machine

George H. Fry Co., Mineola, N. Y., offers the Fry model CSG, a semi-automatic bag closing machine that double-folds, heat seals the inside of the bag, and glues the second fold to the first. The operation is continuous and no reciprocating or cyclic motions are employed. The machine is adjustable for various bag heights and also handles non-heatsealable bags by gluing the folds. (See Advertisement p. 105.)

Stoker Volumetric Packer

A bag packer that employs the bulk material being packed as the motivating power source is being offered by H. L. Stoker Co., Claremont, Calif. The model VP Volumetric Packer is the latest member of the Stoker line of packers. Complete data on the unit is available from the company at P.O. Box 112, Claremont.

Carrier Bag Flattener

A vibrating bag flattener, designed to flatten bottom-heavy bags of loose, bulk material, is being manufactured by the Carrier Conveyor Corp., Louisville, Ky. The flatteners work on the natural-frequency principle, gently tossing the bags upward and forward with each movement through the trough. Flattening is reportedly achieved almost immediately.

There have been a number of obvious trends involving sweeping changes in the formulation of fertilizers and insecticides over the past ten years, principally the growing popularity of granular products, both fertilizers and pesticides, the increased emphasis on liquids rather than solids, and the tremendous expansion in use of anhydrous ammonia. As might be anticipated, complete new lines of equipment had to be designed to manufacture and to handle and apply the resulting new type products.

It is not surprising then that in this comprehensive review of new equipment for manufacture, handling and application of fertilizers and insecticides major emphasis is on equipment developed for processing and applying liquid and granular insecticides, fertilizers, herbicides, etc. Equipment reviewed includes: processing equipment for fertilizers and insecticides; weighing, bagging and conveying equipment; and applying equipment for insecticides, liquid and solid fertilizers, and fumigants.

MIXERS and BLENDEES

Young Dust Blending System

A 500-lb portable dust blending system, with capacity of 4 to 500 pound batches per hour is made by Young Machinery Co., Muncy, Pa. The system includes a dust hood at loading station, sifter, pre-mixer; at floor level, conveyor-blender, after-mixer with dust collector, dust hood at packaging station.

Stedman Fertilizer Plants

Batching, wet and dry mixing systems are among the fertilizer plant equipment offered by Stedman Foundry and Machine Co., Aurora, Ind.

The firm specializes in mixing and bagging units, complete granulating plants, pulverizers, dust weigh hoppers, vibrating screens, belt conveyors, hoppers and chutes, bucket elevators etc. for the fertilizer industry.

Poulsen Liquid and Dry Blenders

Poulsen Co., Los Angeles offers complete Ready-to-Run (R-T-R) plants for fertilizer and insecticide production. The Poulsen R.T.R. Uni-Blender is a small space, insecticide production plant for mixing blending and packaging insecticide dusts in concentrated or field strength form, from ingredients requiring reduction in particle size or liquid impregnation.

A liquid blending tank, water

jacketed with immersion heaters, is adaptable for melting and blending such insecticides as BHC, DDT Toxaphene, etc.

Poulsen also provides design, engineering, and manufacturing of complete plants for producing various plant foods, granulating plants, superphosphate plants, mixing plants, ammonium sulfate plants.

Marion Dry Mixer

Rapids Machinery Co., Marion, Ia., manufacture the Marion Mixer for dry and semi-dry materials, such as insecticide formulations or fertilizers. The unit has a capacity of 1/2 to 2 tons.

Sturtevant Fluid Energy Mill



Dry Fertilizer Mixer

Andrews Machine Co., Decatur, Ill., offers a dry fertilizer batch mixer which will deliver seven tons of pulverized and completely mixed fertilizer per hour.

Munson Rotary Blender

The Munson Mill Machinery Co., Utica, N. Y., is manufacturing a rotary blender which handles dusts granules and powders—blends insecticides, fertilizers, antibiotics and herbicides etc. The Munson rotary blender will impregnate as high as 40 per cent liquid on sorptive clays. Spray pipes may be installed to spray liquids on dust and granular materials. The mixing cycle is fairly short, taking about ten minutes for the complete cycle of loading, impregnating, and discharging. A package plant is offered also, including a loading hopper, blender, bucket elevator, and receiving hopper. (See Advertisement p. 106.)

Sturtevant Micronizer

The Sturtevant Mill Co., Boston, Mass., is offering fluid energy grinding mills which pulverize fines in the lower micron ranges as small as $\frac{1}{2}$ micron, depending on the nature of the material processed and grinding requirements. The Sturtevant Micronizers grind and classify in a single chamber. Because of the quick passage of the material through the machine in a cool atmosphere there is no attritional heat. The particles grind each other by violent impact. Fines are classified in the central section of the chamber and then collected for bagging. The mills range in size from 3 inch grinding chambers to 36 inch. Capacities vary from several pounds an hour to more than a ton. (See Advertisement p. 98.)

Bradley Hercules Mill

Providing a uniform grind from 20 to 325 mesh, the Bradley Pneumatic Hercules mill made by Bradley Pulverizer Co., Allentown, Pa., is recommended for fine grinding of limestone, phosphate rock, etc. For semi-fine grinding of agricultural limestone, the Bradley Hercules mill offers automatic electrical feed control, eliminates manual operation. (See Advertisement p. 93.)

Raymond Insecticide Mills

Specializing in a mill for general purpose insecticide grinding, Combustion Engineering, Inc., Raymond Division, Chicago, offer the Raymond Roller Mill. Equipped with a Whizzer Separator, the mill provides close fineness control over a wide range. Typical current applications are in grinding DDT mixtures, BHC mixtures, rotenone roots, dusting sulphur. The mill is also economical for producing concentrate formulations, fillers and soil conditioners, such as finely ground limestone and phosphate rock. (See Advertisement p. 78.)

Williams Roller Mills

Grinding from 20 to 400 mesh, and micron sizes, is possible with the Williams Roller Mills made by Williams Patent Crusher & Pulverizer Co., St. Louis. Pulverizing is effected by grinding rolls spinning centrifugally against a bull ring. A continual rising current of cool air sweeps upward, carrying ground material to the classifier that separates all finished fines from the coarse tailings which are returned for further grinding.

Kennedy Ball Mill System

Kennedy-Van Saun, New York, report grinding unit capacities to 75 tons per hour, using their Air Swept Ball Mill grinding system. Use of the Kennedy classifier with the mill makes possible production of a wide range of product sizes by external adjustments. Foreign matter (metals etc.) does not damage system, and no magnetic separation is required.

DRIERS — COOLERS

McDermott Rotary Dryer

McDermott Bros. Co., Allentown, Pa., manufactures rotary dryers for drying granulated fertilizer, which are two to three times as large as those in use before the advent of granulation. The dryers are equipped with heavy type trunion wheels and sturdy tires. Large thrust rollers prevent longitudinal movement, and keep the shell rotating smoothly. Large spiral flights are provided at the feed end to move material quickly into the shell and prevent spilling. A retaining ring at the feed end prevents back-spill.

Renneburg DehydrO-Mat Dryer

For the fertilizer industry, Edw. Renneburg & Sons Co., Baltimore, offer a variety of equipment, including ammoniators, coolers, dryers, elevators, granulators, conveyors. Two recently developed units for the industry are the DehydrO-Mat Dryer and the Continuous Combination Ammoniator-Granulator.

The DehydrO-Mat consists of a varying diameter cylinder which regulates air and material velocities, controls temperature drop and product retention time. The compact Ammoniator-Granulator offers high rates of ammoniation and flexibility of operation to permit any retention, time, vary speed of rotation, bed, depth. (See Advertisement p. 83.)

Hardinge Dryers, Pulverizing Mills

The Ruggles-Coles XH-XF Pilot Plant Dryer, manufactured by the Hardinge Co., York Pa., is a single shell, direct fired, rotary dryer designed especially for laboratory use. It is applicable also for small capacity unit processes requiring a drying step, either intermittently or continuously. The dryer, arranged for parallel or counterflow operation, can be used with any available gas supply. The system has an evaporation capacity up to 40 pounds per hour. Various styles of the dryer are designed for sticky materials, ammonium nitrate.

Hardinge also offers a variety of pulverizing mills for dry and wet processes, including conical mills, tricon mills, rod mills, tube mills, disc roll mills, cylindrical mills.

Louisville Dryer

The Louisville Drying Machinery Unit made by General American Transportation Corp., Louisville, Ky., minimizes the dust problem in drying, and offers certain economies from a heat-cost standpoint over a direct heat dryer. The engineering staff of GATC make recommendations on the basis of requirements, and arrange for pilot plant tests.

Included in the line of drying equipment are the Louisville Continuous Atmospheric Rotary Dryer; Continuous Fluidized Bed Dryer; Continuous Solvent Stripper; Continuous Gas Solids Reactor; Continuous Vacuum Dryer.

AGRICULTURAL CHEMICALS

QUIZ

For Multiwall Bag Buyers

*"How Does Your
Packaging Operation
Rate?"*



- 1 Is your bag correctly sized for your product?
- 2 Is your bag properly constructed for your product?
- 3 If loss of product is caused by deterioration, would special protective sheets help to reduce such loss?
- 4 Is the total cost of your bag out of proportion to the selling price of your product?
- 5 Does your product cost warrant redesigning your bag to merchandise your product more effectively?
- 6 Are you using the most economical filling machine available for packaging?
- 7 Are your current suppliers giving you the service you desire?
- 8 Are your suppliers integrated and capable of maintaining dependable service at all times, under all conditions?
- 9 Are your suppliers' representatives qualified to help you with your packaging, sales promotion and marketing?

Perhaps we may be able to help you to arrive at the right answers in order to achieve higher production at lower costs.

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

630 Fifth Avenue, New York 20, N. Y.
Daily News Bldg., Chicago 6, Ill.

Plants at St. Marys, Ga. and Gilman, Vt.

Sales Agents for The Kraftpacker
Open Mouth Bag Filling Machine



☐ O.K. Kraft...Help me to answer your Quiz.
Please have representative call. AC

COMPANY _____
ADDRESS _____ ZONE _____ STATE _____
CITY _____
PRODUCT MFD _____ NAME _____



bag it


1. FAST
2. ACCURATELY
3. ECONOMICALLY

Richardson HA-39 Fertilizer Bagger

Any fertilizer manufacturer using a Richardson HA-39 Bagger can check off all three as well done! Richardson leads the field in all requirements for fertilizer bagging equipment. Here are some of the reasons you can look to Richardson for more efficient fertilizer production.

The Leader!

- **SPEED**—Up to twenty-four bags a minute. Capacity 50 to 125 lbs.
- **ACCURACY**—Over two million test weighings proved the Richardson HA-39 Bagger accurate to within an average of 2 ounces!
- **ECONOMY**—Saves time (high speed operation). Saves labor (fully automatic). Saves materials (prevents overweights).
- **SIMPLICITY**—Only 5 basic components, (frame, chute, feeder, beam system with hopper, bagging spout) . . . easy to operate, easy to maintain.
- **RUGGEDNESS**—Stainless—heavy gauge plate, life tested. Dust tight housing. Built for fertilizer use. Weight over 2400 lbs.

Backed by 55 years of experience in automatic weighing. For complete details ask for Product Data Sheet 5601 with complete specification list. 

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY, CLIFTON, NEW JERSEY
 Atlanta • Boston • Buffalo • Chicago • Cincinnati • Houston • Memphis • Minneapolis
 New York • Omaha • Philadelphia • Pittsburgh • San Francisco • Wichita • Montreal
 Toronto • Havana • Mexico City • San Juan • Geneva, Switzerland • Nottingham, England

Fertilizer producers adding to their equipment, expanding their plants, or building new plants and branches are offered complete design, custom built units and specialized services by several engineering-equipment-manufacturing firms.

The Blaw-Knox Co., New York, designs, engineers, and builds plants for the process industries. The company's engineers are equipped to handle any expansion plans, including new plants or modernizations of existing plants for production of fertilizer, nitric acid, ammonium nitrate, and anhydrous ammonia.

Blue Valley Equipment Manufacturing and Engineering Co., Topeka, Kans., specializes in granulation equipment . . . recently added two new sizes of granulating units to their line of fertilizer plant equipment. Thus they now offer a total of four different sized units, ranging from 12, 18, 24 to 36 average tons per hour. All four units are built for either double or single screening for either batchmixing or continuous ammoniation. (See Advertisement p. 22).

A. J. Sackett & Sons Co., Baltimore, build complete fertilizer plants, including the individual equipment units (batch mixers, coolers, crushers, dust arresting equipment, etc.) The most recently developed unit is the Sackett Star Granulator, featuring a new approach to the problem of granulating mixed fertilizers. Other production processes offered include a phosphate production plant, mixed fertilizer plant, continuous granulation and ammoniation plant. Sackett engineers offer complete plants or modernization programs. (See Advertisement p. 58.)

Chemical and Industrial Corp., Cincinnati, specialize in plants for production of nitric acid, phosphoric acid, ammonium nitrate, complex fertilizer, ammonium phosphate, and anhydrous ammonia. A prilling unit is a particular feature of this engineering firm.

Fertilizer Engineering & Equipment Co., Green Bay, Wis., feature a granulation unit said to "boast a low initial cost." The unit is equipped with a dust collecting system which

reduces flue loss and recycles the collected dust back into the process.

The Lummus Co., New York, has opened a new engineering development center at Newark, N.J., for carrying out pilot plant investigations for chemical manufacturers. Most pilot plant units at the center are put together from standard "building blocks" and process equipment can be widely varied. With the new facilities it is possible on many jobs to project actual productive yields to within 0.01 per cent.

Luria Engineering Co., New York, unites high speed, low cost construction with the special design requirements of custom building. A designer and fabricator of fertilizer plants, Luria adapts standardized structures to individual requirements to bring speed and economy to expansion programs.

OTHER PRODUCTION UNITS

Omega Feeders

The Omega Machine Co., division of B-I-F Industries, Inc., Providence, Rhode Island, manufactures the Omega Feeders which provide precise control of ingredient proportions for formulators of fertilizers and pesticides. Individual feed rates are instantly adjustable to fill various formula requirements. Total production with the Omega feed line can be geared to meet seasonal demands and is easily increased as markets develop.

Continuous Ammoniator

Blue Valley Equip. Mfg. & Engr. Co., Topeka, Kans., manufacture TVA type continuous ammoniators in several sizes. Recent changes include an improved design for sparger arrangement and scraper action. Dry ingredients are fed continuously into the ammoniator. The Blue Valley process permits the use of low-cost liquid ingredients such as anhydrous ammonia, nitrogen solution, water, steam, and phosphoric or sulphuric acids. The Blue Valley equipment makes possible economical formulation, efficient ammoniation and granulation.

Johnson Equipment

Fertilizer buckets, distributors, compressors, conveyors, weigh batchers, mixers, are among the bulk material handling units offered by C. S. Johnson Co., Champaign, Ill. Sold individually or as complete blending plant which batches, blends materials in one cycle of operation, Johnson advises it will adapt complete plants or individual units to suit requirements. The plants can be operated on a fully automatic or manual control. (See Advertisement p. 101.)

Fuller Airveyor

The Fuller Co., Catasauqua, Pa., manufactures pneumatic conveying systems for unloading dry pulverized, crushed, and granular materials from cars, trucks, ships, and barges. Three general types of systems are available. Vacuum or car-unloading type, pressure type, and combination vacuum and pressure type. The Airveyor is furnished complete with the piping, air ducts, blower, electrical equipment, and the necessary accessories.

Joy Limberoller Idler

The Joy Manufacturing Co., Pittsburgh, Pa., manufactures a self-cleaning, flexible, belt conveyor idler to meet problems encountered by the agricultural chemicals industry when handling wet, sticky, abrasive, or corrosive chemicals. Called the Limberoller idler, it consists of a series of neoprene discs firmly molded to a neoprene coated steel wire cable. Suspended between two precision ball bearings, the cable and discs form a single roll with a natural trough. Self-cleaning is accomplished by the constant flexing of the cable and discs. (See Advertisement p. 71.)

Farquhar Loading Conveyors

The A. B. Farquhar Division of the Oliver Corp., York, Pa., is manufacturing a heavy-duty power belt conveyor which can be installed in fertilizer plants to double truck-loading capacity. Starting at the bagging machines, the conveyor carries bags directly to waiting trucks. An expandable power belt conveyor as the final stage of the system enables the bags to be delivered to the loader on the truck at the right spot (Continued on Page 95)



How Double-Testing Gives You Assurance That SPENSOL Meets Your Specifications:

The quality control laboratory is Spencer's "secret weapon" that makes sure you get the exact specifications you want in nitrogen solutions!

At each of Spencer's three nitrogen plants, a special quality control laboratory — completely separate from the standard production testing operation—double-checks every batch of SPENSOL.

Here, a laboratory analyst makes a series of tests on two samples taken from each batch of SPENSOL that is made. The samples are tested to see if they meet the ammonia specification, ammonium nitrate specification, and to see if the corrosion inhibitor is full strength.

Even if the two samples test out to the correct specifications, they must be almost identical in composition, or the batch cannot be shipped!

What's more, the final calculations which determine if a sample meets specifications are double-

checked by another laboratory analyst for accuracy. If either man finds that the SPENSOL solution does not meet exact specifications, the plant makes the needed corrections in the formulation and the testing process starts all over again!

Quality control like this is one of the many reasons why so many mixers are switching to Spencer Nitrogen Solutions. Of course, quality control isn't the only advantage mixers get from Spencer.

For example, to help manufacturers find ways of producing higher analysis mixed fertilizer with low-cost raw materials, Spencer recently erected a mixed fertilizer demonstration unit near Pittsburg, Kansas. And Spencer's Technical Service Team is always available to help mixers trace down the cause of trouble in plant operation.

In the fields, too, you'll find Spencer working for you. Spencer agronomists are constantly promoting better farming methods, encouraging soil tests, and advising farmers to use recommended rates of mixed fertilizer.

So before you place another order for nitrogen solutions, consider how much more you get when Spencer is your supplier. Switch to SPENSOL and see for yourself!



SPENCER

Insist on SPENSOL (Spencer Nitrogen Solutions)

SPENCER CHEMICAL COMPANY, Dwight Bldg., Kansas City 5, Mo. District Sales Offices: Atlanta, Ga.; Chicago, Ill.; Memphis, Tenn.; Kansas City, Mo.; Works: Pittsburg, Kans.; Chicago, Ill.; Henderson, Ky.; Vicksburg, Miss.; Orange, Tex.

America's Growing Name in Chemicals

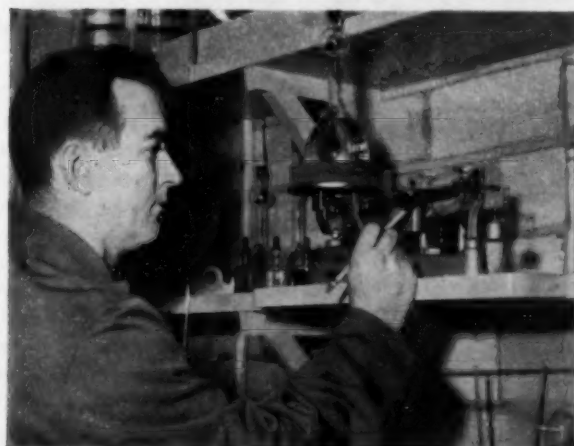
AGRICULTURAL CHEMICALS



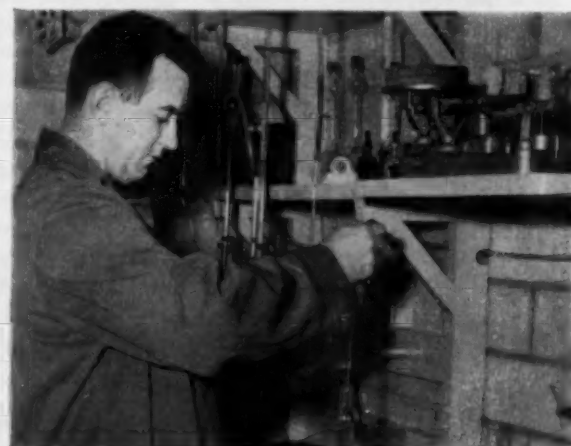
1 When a batch of SPENSOL is completed at Spencer's Jayhawk Works, laboratory analyst Carl Graham goes to the plant to take the samples needed to make tests in the quality control lab.



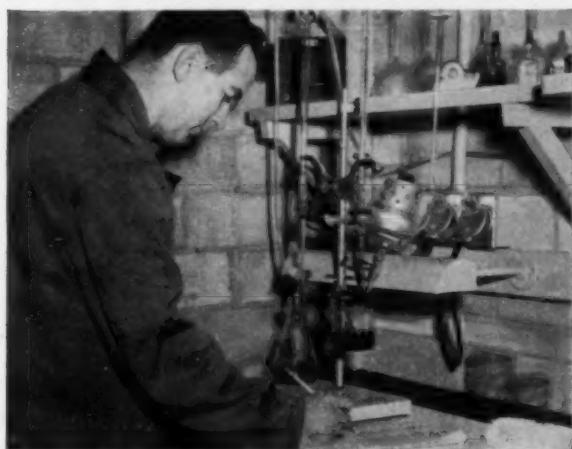
2 Sure that enough time has passed so that the nitrogen materials are properly mixed, Carl takes two samples of SPENSOL direct from one of the huge aluminum mixing tanks in the plant.



3 At the quality control laboratory, fifty yards distant from the plant, Carl takes the first step in the test: Weighing the two samples before taking a specimen of each for testing.



4 Now the actual testing begins. One of the two samples is tested to see if it contains the proper amount of ammonia. The other sample is checked for its content of ammonium nitrate.

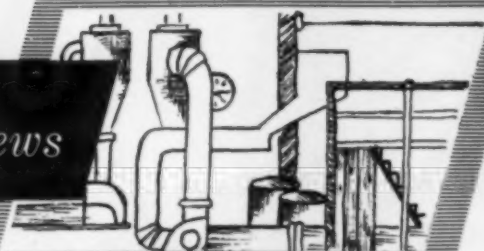


5 After the final test, which is for strength of the corrosion inhibitor, Carl records the results. Then, he makes the final calculations which will be double-checked by another lab analyst.



6 Now Carl is ready to call the plant. He advises the operator as to what changes must be made, or gives the go-ahead for shipment if the batch of SPENSOL has met all qualifications.

Fertilizer Views and News



Production Hazards in Granulation

As often observed, fertilizer manufacture today is no longer a chance mixing of the various nutrients by non-skilled personnel. Trained operators are required to use more specialized equipment . . . to recognize variations in operating conditions and make corrective adjustments.

The trend toward granular products has further complicated production operations, introducing new hazards. At the recent meeting of the National Safety Council, Elmer C. Perrine* pointed out that it is convenient, but certainly neither safe nor accurate to believe that granulation is merely an extension of the making of pulverized fertilizer. There are several aspects in the use of sulfuric and phosphoric acid, largely confined to granulation, that demand increased alertness. The trained observer, he noted, because of understanding granulation principles can often predict trouble before it reaches hazardous proportions.

Relatively competent operators are familiar with the fact that superphosphate will readily hold large amounts of ammonia at high efficiency only if the ammonia is delivered to the superphosphates in direct proportion to the amount of superphosphates that are adjacent to the various regions of the distributor pipe. He also knows that the ammonia should be mixing with the superphosphates as it enters the mass. These features were fortunately developed ahead of granulation, and have been adopted essentially as originally developed, without there being many serious accidents in the adopting.

On the other hand, only a relatively few of the operators realize that

the sulfuric acid should be as uniformly matched against the ammonia as should be the superphosphates. The formula may be adjusted correctly as regards the maximum ammonia take-up by the superphosphates and the sulfuric acid. But through faulty design of equipment or its maintenance, or some imbalance in the process, there may be local areas of varying sizes where excesses of acid exist.

Poor production techniques and operation methods are not only inefficient and expensive, but also dangerous, creating situations which may result in fire or acid burns of personnel. A trained operator can recognize the contributing factors and correct well in advance of any trouble.

In the usual fertilizer plant, under no circumstances should the same distributor pipe be used for ammoniating solutions and for acid. The mixing of these two products in a chamber as they enter the mixer has resulted in serious trouble.

Some operators have been observed to apply the sulfuric acid in one large stream through an open pipe. Others, through poor inspection or maintenance, have been doing about as poorly when an originally good acid or ammonia distributor pipe had corroded or worn so badly that nearly all of the material was escaping through one hole. There is a very serious corrosion problem where the acid has become hot and diluted with water. Abrasion on submerged pipe is also severe. The plugging of holes has been almost as serious as corrosion and

abrasion in destroying the delivery pattern in many cases. Any change on pressure requirements of acid, water, or ammoniation medium should arouse immediate suspicion.

The risks in using acids with nitrogen solutions can be materially reduced through the same means that achieve maximum granulation.

Summarizing, the technical properties of some of the ingredients that are used in large quantities in modern fertilizer making are such that indiscriminate use or poor equipment can result in fires or explosions in extreme cases. Some of the conditions have been exposed; there may be others as yet not isolated, but a high degree of control has been effected when the conditions revealed are respected in operations.

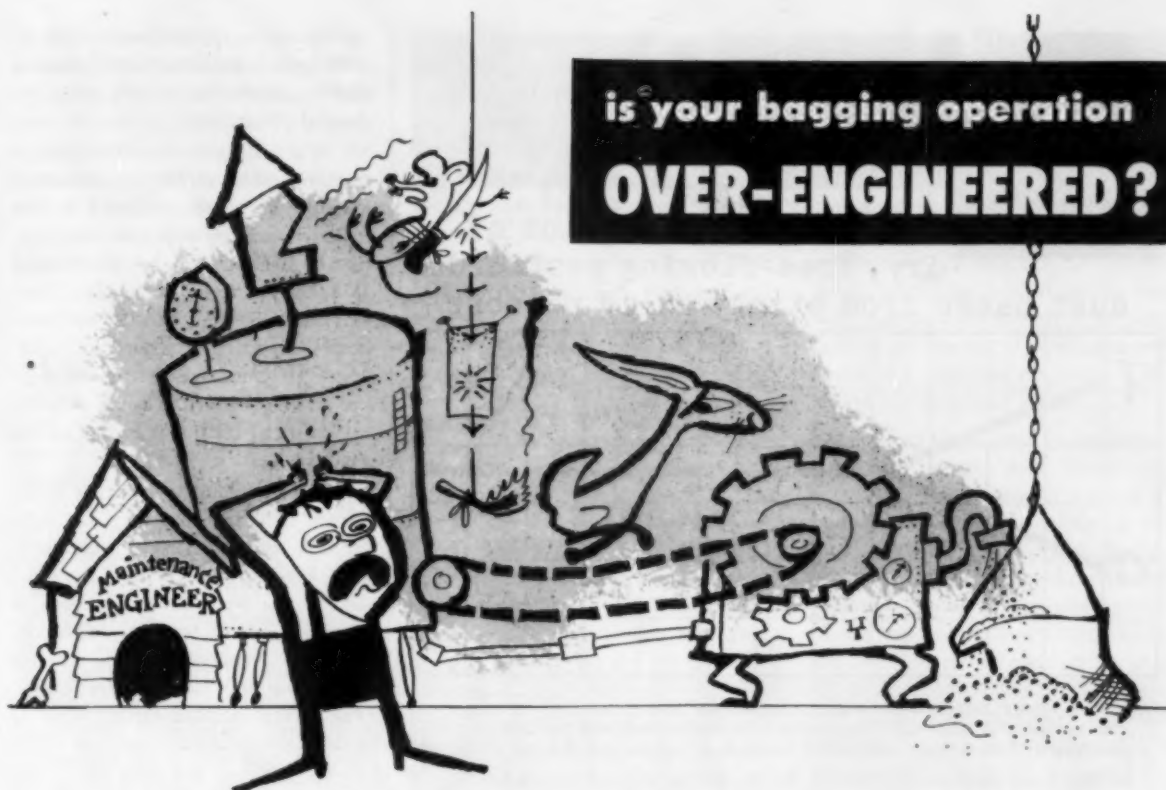
Although they are no guarantee of immunity, the practices and equipment that use the ingredients most effectively are good precautions against hazards.

The requirements are generally that all ingredients, liquid and dry, be mixed uniformly throughout the entire mass, the acid and ammoniating medium particularly being so delivered that they are mixing uniformly as they enter the mass. These are also good operating techniques in general.

The Non-farm Market

OVER two million tons of fertilizer, worth \$187,000,000, are sold annually to the non-farm market, according to a survey just made by the National Plant Food Institute, Washington, D. C. This amounts to approximately ten percent of the total fertilizer market. The NPFI findings

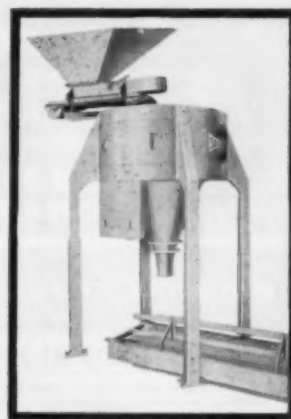
*Report on "Reducing the Hazards of Using Nitrogen Solutions and Acids" by Elmer C. Perrine, technical representative, Nitrogen Division, New York, at the Fertilizer Section meeting of the National Safety Council, Chicago, October 22, 1957.



You need the new SOUTHLAND PACKER!

- **IT'S SIMPLE!** Just one scale system—not two or three—fewer moving parts, wearing points.
- **IT'S FAST!** Up to 30 50-lb. bags per minute, up to 25 80's and 100's—more than a single sewing machine can handle.
- **IT'S GUARANTEED ACCURATE!** Maintained weighing accuracy is guaranteed on 50-lb., 80-lb., 100-lb., and 200-lb. bags.
- **IT'S DURABLE, RUGGED!** Heavier, more rigid construction—generous use of stainless steel and non-corroding nylon bushings.
- **IT'S COMPLETELY ELECTRIC!** No troublesome air cylinders or hydraulic connections—needs no compressor.

The SOUTHLAND costs less, *saves more* . . . less spillage and dusting; minimum headroom and floor space; simple installation and maintenance. Enthusiastic users say it's "tops" in dependability.



All this, complete, less conveyor

only \$2500

f.o.b. Chattanooga

DISTRIBUTED EXCLUSIVELY BY

CHASE BAG COMPANY

Packaging Specialists for over 100 years

CHASE BAG COMPANY

525 International Trade Mart, New Orleans 12, La.

Please send me free complete information on the new SOUTHLAND PACKER.

Individual

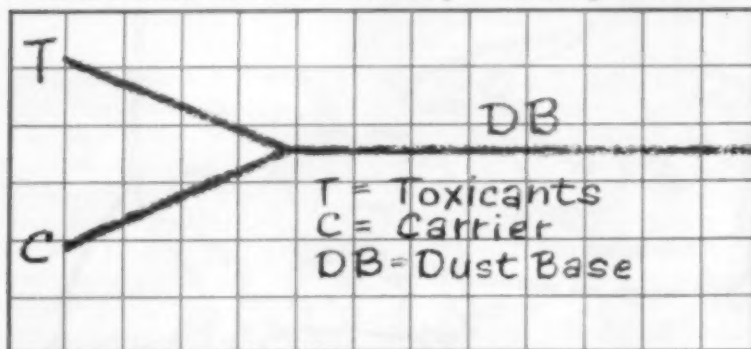
Company

Street

City, Zone, State

MIN CHEMISTRY at work

case: Quick, easy production of dry, free-flowing pesticide dust bases from sticky solid poisons



Heavy, sticky, lumpy dusts plague formulators and growers. The proven way to avoid this trouble is to make dusts and wettable powders with Attaclay®—M & C's Attapulgite carrier and diluent.

Report on Solid Poisons with Attaclay: Attaclay has exceptionally high sorptivity. This goes to work as soon as carrier and toxicant meet in mill or blender. Results:

- High Carrier Efficiency**—established in all types of equipment . . . under light loads or when batches are pushed through in the rush season.
- Variables Controlled**—"takes up the slack" when technicals vary, or when temperature or humidity hit bothersome extremes.

Costs Cut, Products Improved—dust and powder formulating costs cut 25% on the average; end products rated premium by blenders, dealers, growers.

Our business is to supply the "agchem" trade with low-cost, nature-given products that are process-engineered to make things go smooth in your plant . . . good in your markets. Use the coupon.

MINERALS & CHEMICALS CORPORATION OF AMERICA
2009 Essex Turnpike, Menlo Park, N. J.

I'm interested in a natural mineral product for _____

Send: ☐ Detailed "agchem" literature ☐ Free samples

name _____ title _____

company _____

address _____

city _____ zone _____ state _____



MINERALS & CHEMICALS

CORPORATION OF AMERICA
2009 Essex Turnpike, Menlo Park, N.J.

Leaders in creative use of non-metallic minerals

ATTAPULGITE (Attapulga)

ACTIVATED BAUXITE (Porocel)

KAOLIN (Edgar • ASPs)

LIMESTONE (Chemstone)

SPEEDI-DRY FLOOR ABSORBENTS

were based on approximately 3500 reports from home owners, golf courses, airports, cemeteries, schools, parks, industrial plants, etc.

The findings indicate that private dwellings account for approximately half the fertilizer consumed in the non-farm market, with total consumption by home owners being estimated at 1,099,000 tons. Some plant food was used by 45% of all the non-farm homes reporting, consumption averaging 51 pounds per home. Average use was highest in the South Atlantic region (110 lbs.) and lowest in the far west (15 lbs.)

All golf courses reporting in the survey indicated that they are regular users of fertilizer, with consumption averaging 44 tons. Cemeteries and camps were also unanimous in reporting use of fertilizer, with consumption averaging 9 tons a year for cemeteries and one ton for camps. The survey included reports from 32 state highway departments, of which 26 use fertilizer and 6 do not. Total use on the highways was estimated at 21,868 tons for 1956, with two-thirds of this being accounted for in the seven states of New York, Ohio, North Carolina, Georgia, Florida, Mississippi and Wisconsin. It is anticipated that increasing quantities of fertilizer will be used in connection with future highway construction, since new highways will average 22 acres of turf per mile.

Three-quarters of the airports surveyed reported that they use fertilizer, the average amount being 23 tons. Industrial plants in general do not use fertilizer, only one in six of the plants reporting indicating regular fertilizer use.

Per capita rates of consumption were reported highest in cities with populations between 40,000 and 45,000. In smaller cities there are fewer large users such as golf courses, educational institutions, large parks, etc., to boost consumption, while in the larger cities the proportion of apartment buildings and row houses increases, thus limiting average fertilizer use.

Finally, the survey disclosed that the non-farm buyer, like the farmer, tends to buy his fertilizer in sizable

AGRICULTURAL CHEMICALS

packages, with the 80-pound bag accounting for most of the tonnage in four urban test areas studied. Packages containing less than 50 pounds of fertilizer made up only 3% of the sales total in two test areas, while in two others the percentage sold in small containers was 15 and 16% respectively.

Creative Pricing

A NEW phrase, "creative pricing" was coined by Mr. Fred C. Foy, president of the Koppers Company, at a recent marketing conference sponsored in New York City by the National Industrial Conference Board. Creative pricing versus pricing by accident was his theme. Pricing by plan is needed, he said, to prevent reckless price changes and insufficient revenue for growth and industrial progress.

Asked to explain in more detail, he pointed out that in the chemical industry some branches cut prices this past season in a way that had no relation to customer or market needs or to production improvement. The

reductions neither created new markets nor extended them. They did, however, materially reduce the operating margins of all the companies in the field that met the price. It seemed to him that management responsible for the cuts had not given sufficient thought to what they were doing and to the possible consequences of their action. Although Dr. Foy was not referring to the agricultural chemicals industry, he could have included it very aptly in his survey.

How is the chemical industry to cure this sliding-profits situation caused by pricing without plan or as some call it, "price anarchy"? Mr. Foy analyzed the reasons for the situation: Perhaps a company has developed more productive capacity than its sales efforts can sustain. Management in such a case only too often meets it by slashing the price on the assumption that the price cut will keep the plant going at top capacity. Therein lies false reasoning. In most cases of this sort, reductions do not create new business nor do they ex-

tend the market. Their net effect is to materially decrease the operating margins of all the companies in the field because the competitors meet the price. The price cut was not carefully planned. To be effective such cuts must be related to customers or market needs or to improvements in production. A product, he emphasized, should be sold at prices that will enable a company or an industry to earn that margin of profit that will enable it to continue the research, essential for continued growth.

Pricing by accident is dangerous: if too low one can price himself out of markets, out of growth and out of business. Even the customer in the long run suffers from such ill-conceived practice, because he will not be able to get better products suitable to his future needs. Management, said Mr. Foy, should consider the true value of a product to a buyer and the margin of profit needed so that the company can continue its growth through research, good wages, financ-

(Continued on Page 111)

Escambia Chemical, a Bright, New Name in Nitrogen

"BAY-SOL" NITROGEN SOLUTIONS

ANHYDROUS AMMONIA

AMMO-NITE AMMONIUM NITRATE FERTILIZER — 33.5% NITROGEN



MORE IN SERVICE, MORE IN QUALITY

Technical service field representatives, to aid you with any problem, are as near as your telephone.

Modern, easily accessible manufacturing plant and continuing research.

Conveniently located service offices.

Strong supporting advertising in newspapers, farm magazines and other media.

Manufactured by

Escambia Chemical Corporation
Pensacola, Florida

Distributed Exclusively by

Ashcraft-Wilkinson Company
Atlanta, Georgia

SUBJECT OFFICES: Norfolk, Va., Charleston, S.C., Tampa, Fla., Jackson, Miss., Montgomery, Ala., Columbus, Ohio, Des Moines, Iowa.

THE FLUID ENERGY



The modern mill for processing heat sensitive organic toxicants

Pesticides and fungicides in concentrates and field strength wettable powders and dusts, using BHC, Chlorodane, DDT, Dieldrin, Endrine, Heptachlor, Toxaphene and similar organic toxicants, can now be prepared with ease, using the Fluid Energy "Jet-o-mizer."

This heatless, motionless mill processes these low melting point, heat sensitive materials with a minimum of mill build-up. There are no moving parts to generate heat, no screens to plug.

Formulation is simplified too. Inerts do not compact . . . there is no lowering of oil absorption value. Consequently, less high priced carrier is needed . . . more lower cost extender can be used.

And there are other values to Fluid Energy processing of these important agricultural chemicals:

- The "Jet-o-mizer" grinds "coarse" . . . for specifications calling for 325 mesh products. Or they grind fine . . . as low as $\frac{1}{4}$ micron average, or to satisfy WHO and ICA requirements.
- The "Jet-o-mizer" is versatile . . . it handles a wide range of raw materials and products well . . . it is ideally adapted to off-season grinding of inerts and other materials.
- The "Jet-o-mizer" operates continuously . . . guaranteeing the maximum of product uniformity and throughput.
- The "Jet-o-mizer" efficiency at the fine grind end of the spectrum improves residual toxicity of most pesticides.
- The "Jet-o-mizer" combines many operations . . . wet clays can be dried, ground, blended with toxicants and classified . . . all in one operation.
- The "Jet-o-mizer's" superior blending and grinding reduces the need for costly preparatory equipment.
- The "Jet-o-mizer's" perfect partner for high product recovery is the patented "Jet-o-clone" . . . designed specifically for fine particle collection.

Investigate our facilities for product testing and custom grinding.

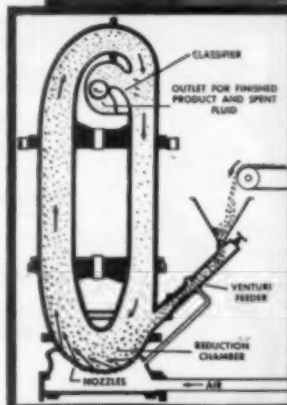
Investigate the extra profit possible with "Jet-o-mizing!"

The "Jet-o-mizer" uses air as the elastic grinding fluid . . . there are no moving parts . . . no heat from grinding . . . low maintenance.

Send for our new bulletin describing "Jet-o-mizers" and "Jet-o-clones."

FLUID ENERGY PROCESSING & EQUIPMENT COMPANY

Richmond & Norris Sts., Philadelphia 25, Pa.
(Formerly known as the Wheeler-Stephanoff Mill)



A typical Fluid Energy Mill installation, in continuous operation for more than ten years.

LISTENING POST

By Paul Miller



This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Epidemics and Identification Section, Horticultural Crops Research Branch, United States Department of Agriculture, Beltsville, Maryland.

Acti-Dione Treatment of Blister Rust Trunk

ACCORDING to Virgil D. Moss*, of the Division of Blister Rust Control, Region One, Forest Service, United States Department of Agriculture, few tree diseases afford better opportunities for direct control than the white pine blister rust caused by the fungus *Cronartium ribicola*. First, the alternate host plants, currants and gooseberries, which are essential for the complete life cycle of the rust, can be destroyed to prevent infection of white pines. Second, trees that do become infected can be saved by pruning diseased branches before mycelium of the fungus advances into the trunk, or even after it enters the trunk, usually by removing enough bark to contain all the fungus.

"The best opportunity to save infected white pines comes when a diseased branch is pruned before mycelium advances into the trunk. At this stage no special operating skill or knowledge of the rust is required to obtain satisfactory results." On the other hand, "After mycelium enters the trunk, technical skill and knowledge are essential to excise a high percentage of cankers successfully." In one study of methods to eliminate cankers from young eastern white pine, a saving of 100 per cent resulted from pruning the diseased branches before mycelium entered the trunk, as compared with 69 per cent when bark was cut out of the trunk

from around stubs of pruned diseased branches where the near margin of the branch canker was within six inches of the trunk.

"Success of the excise trunk canker method depends upon whether adequate allowance is made in bark removal for mycelial extent beyond the outer limits of surface discoloration" says the author. He cites other studies showing that surface discoloration is not an indication of mycelial extent, since the distance of mycelial growth beyond the canker margin depends on age and stage of canker and thickness of bark at the outer limits of surface discoloration. "Accordingly, in practice a distance is

arbitrarily fixed so that the amount of bark removed from the trunk beyond the outer limits of surface discoloration supposedly is in excess of maximum mycelial extent for each pine species."

The author conducted an experimental study on the use of fungicidal applications to increase the effectiveness of the excise trunk canker method.

MATERIAL AND METHODS:

Twenty-year-old western white pine trees in a plantation in the Coeur d'Alene National Forest, Idaho, were selected for treatment, if a trunk canker was producing pycniospores or aeciospores and was unlikely to girdle the trunk before tests were completed. When more than the one canker was found on a trunk, all stages, including the juvenile non-sporulating stage, were treated. Ten trees were used for

Table 1. Effect of Acti-dione, endomycin, and calcium sulfamate on blister rust, *Cronartium ribicola*, as shown by mycelial activity in the perimeter of excise trunk canker wounds on western white pine trees. Dates of treatments and results are July 1953 and October 1956, respectively.

Treatment	Cankers treated—number				Cankers killed—percent			
	J	P	A	Total	J	P	A	Total
Acti-dione (cyclohexamide) (ppm)								
150	6	3	9	18	100	67	78	83
300	7	5	10	22	86	80	70	77
600	8	3	9	20	100	33	78	80
Endomycin (ppm)								
150	4	5	5	14	25	20	0	14
300	8	4	6	18	63	75	0	44
600	10	5	7	22	50	40	0	36
Calcium sulfamate (5 per cent)								
Form A	4	3	9	16	50	0	0	13
Form B	5	2	10	17	40	50	10	24
Form C	6	5	8	19	33	20	0	16
Check cankers	5	5	7	17	60	20	0	24

J = juvenile canker; P = pycniospore stage; A = aeciospore stage.

*Virgil D. Moss, "Acti-dione treatment of blister rust trunk cankers on western white pine," *Plant Disease Reporter* 41, #8, 709-714. (Aug. 1967).

HELP YOURSELF TO BIGGER PROFITS

PHOSPHATE PRODUCTION

No other process begins to compare with way-ahead Sackett SUPER FLO in making normal, fortified and triple super-phosphates of premium quality at way lower cost.

MIXED GOODS MANUFACTURE

Your investment in the latest Sackett Methods of producing conventional fertilizers is guaranteed to pay handsome returns. We are anxious to prove it.

MODERNIZATION PROGRAMS

Step ahead of competition by entrusting your fertilizer expansion and modernization facility programs to our care. Many of the most forward-thinking fertilizer producers are glad they did.

GRANULAR FERTILIZER

Sackett Equipment leads the field in Granular Production.

The names of the fertilizer companies who have selected Sackett Granulating Processes above all others, read like a "Who's Who in Industry".

NEW PLANTS

Invest your dollars wisely by having Sackett build your new plant. We do the whole job... from the inception stage thru building construction and equipment fabrication to operating plant. See us for guaranteed results.

There is nothing that appeals to a man's reason more than plain facts. And, one plain fact is this . . . you can help yourself to bigger profits by resolving now to replace wasteful obsolete plant equipment with the latest rock-bottom cost methods as exemplified in Sackett Production Processes and Materials Handling Equipment. Why not start the ball rolling by writing or phoning us today?



1727 S. Highland Ave.

Architects and **Manufacturing** Engineers to the Fertilizer Industry Since 1897.

America's Foremost **Creative** designers & Builders of Commercial
Fertilizer and Superphosphate Plants . . . Related Production Equipment

each treatment. Acti-dione* (cyclohexamide), endomycin, and calcium sulfamate were applied to the cut surfaces of wounds of excise trunk cankers during late July, 1953.

Acti-dione and endomycin were used at concentrations of 150, 300, and 600 parts per million. Acti-dione was dissolved in 5 milliliters of acetone and applied in the isoparaffinic base oil S/V Sovaspray 100. Endomycin dissolved in 5 milliliters of methanol was added to water containing 1% Triton B-1956 as a wetting agent. Calcium sulfamate (5%) was tested in three different formulations: (A) — 10 grams calcium sulfamate, 10 milliliters glycerol, 126 milliliters isopropyl alcohol, 14 milliliters pine oil, 10 milliliters Tween 20; (B) — 50 grams calcium sulfamate, 200 milliliters water, 600 milliliters isopropyl alcohol, 150 milliliters glycerol, 50 milliliters Tween 20; (C) — 10 grams calcium sulfamate, 100 milliliters water, 80 milliliters isopropyl alcohol, 10 milliliters nonic (Sharples), 10 milliliters glycerol. 6 pt.

Lower limbs up to about one-third the crown height were pruned to eliminate branch cankers and facilitate working close to the trunk. Hatchet and pocket knife were used to remove bark from inside the margin of surface discoloration in order to expose mycelium, destroy insect infestations, and eliminate necrotic tissue that hinders callus formation and favors infection by wood-rotting fungi.

The amount of bark cut from a trunk varied according to age, stage, and size of canker. The pitch covering of cankers in the aeciospore stage and the large amount of dead and dying bark contained in them made necessitated removal of the greatest amount of bark from the trunk to expose mycelium. Pycniospore cankers were prepared more easily by removing the small section of bark containing pockets of dead and dying tissue from around the base of the

branch through which infection entered the trunk. With the juvenile cankers, a small amount of live bark was removed to expose mycelium and facilitate penetration by the fungicide.

After the cankers were prepared, the fungicides were applied generously to the cut surfaces of the wounds with a small paint brush.

RESULTS AND DISCUSSION: Excise trunk canker wounds were examined for mycelial activity each year after treatment for 3 years. Bark around wounds was observed for pycniospore and aeciospore production, for swollen bark and color and extension of surface discoloration, for formation and growth of callus tissue, and for parasitism of the rust by the purple mold fungus, *Tuberculina maxima*.

The 183 cankers in all treatments included 63 juvenile, 40 pycnial, and 80 aecial cankers, or respectively 34, 22, and 44 per cent. Pycnial and aecial cankers usually produced spores one year after treatment if there was no inhibitory effect from the fungicide. In juvenile cankers, mycelial activity was manifested by increased swelling of the infected bark tissue and by the orange-yellow color of surface discoloration. In all stages, callus formation was greatly retarded or inhibited entirely by active mycelium in any portion of the bark around wounds. Additional evidence of cycelial activity was often provided by the purple mold fungus, which attacks only the pycnial and aecial stages of the rust. Final results for the three years are given in Table 1.

Check (untreated) trees bore a total of 17 trunk cankers of which four were killed by the bark removal operation. Three of the four were juvenile cankers and one was a pycnial canker, all on a single tree. Of two possible explanations for death of these cankers, drying back of bark from the edges of the wounds was thought not to be responsible, since the lip or exposed edge of the wounds dried out. Resistance to infection in this particular tree seems more likely. The fact that this tree far exceeded all others in the development of callus

tissue probably accounts for the inhibitory effect upon mycelium.

All three concentrations of Acti-dione were about equally effective in killing all stages of the rust. Among the 60 cankers treated by this antibiotic were 21 juvenile, 11 pycnial, and 28 aecial. Three years after treatment one juvenile, four pycnial, and seven aecial cankers were alive, or 5, 36, and 25 per cent, respectively. Of these 12 live cankers, three had been treated with 150 ppm, five with 300 ppm, and four with 600 ppm, or, on the basis of the number treated with each concentration, 17, 23, and 20 per cent, respectively. The lowest concentration of Acti-dione used in these tests was lethal to mycelium in bark around excise trunk canker wounds.

Eleven cankers survived treatment by Acti-dione, because cutting was not sufficient to bring mycelium within range of the short distance that the antibiotic penetrates bark above wounds. The cut surface should extend a few inches beyond the outer limit of surface discoloration in the distal end of cankers to facilitate penetration by the antibiotic. The extra amount of bark required will not add to weakening a tree. An interesting phenomenon for this type of canker is the growth of cycelium in an upward and lateral direction above wounds, in the shape of an arrowhead. No explanation was obtained for the failure of cycelium to grow downward and reinfect bark tissue from which it had been killed out by Acti-dione.

Penetration by Acti-dione was greatest in a downward and lateral direction from the border of wounds. Mycelium in the lower and lateral margins in all trunk canker wounds, except one, was killed by the antibiotic. In this single exception, Acti-dione failed to move laterally around the trunk to kill mycelium that had grown beyond the base of a branch in the same whorl as and close to the one by which infection entered the trunk. This near branch was pruned, but its stub was not treated. Unless there is danger of weakening

(Continued on Page 109)

*Materials for these tests were supplied by the manufacturers: Acti-dione and endomycin by the Upjohn Company; calcium sulfamate by E. I. du Pont de Nemours and Company; S/V Sovaspray 100 by Socony-Vacuum Oil Company; Triton B-1956 by Rohm & Haas Company.



This column, reviewing current insect control programs, is a regular feature of **AGRICULTURAL CHEMICALS**. Mr. Dorward is head—Plant Pest Survey Section, Plant Pest Control Branch, U. S. Department of Agriculture. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the U. S.

By Kelvin Dorward

Truck Crop Insects

APHIDS were active on vegetables during late September in several widely scattered states. In Utah one or more treatments were necessary for the potato aphid on commercial and certified potato plantings in the Beryl-Enterprise area. The melon aphid was very heavy on some commercial cantaloup fields in Major County, Oklahoma. In Alabama fall tomatoes were reported to have heavy aphid populations. In Delaware, aphids on squash were on the increase, and cucurbits were reported infested in Rhode Island. Earlier in September, aphid populations on vegetables throughout New York State were on the increase, with the worst infestations in tomato fields of Chautauqua County since the late 1940's.

The tomato fruitworm, or corn earworm, or cotton bollworm, was causing damage to vegetables in several states. In Luna and Dona Ana Counties, New Mexico, heavy losses occurred to many fields of tomatoes where controls against the tomato fruitworm were not applied. The insect damaged bean plantings in Virginia, squash in Delaware and to some extent sweetpotato vines in Oklahoma. The European corn borer was infesting pepper fruits in the southern part of Delaware, where losses of more than 15 per cent were recorded in some instances. Pepper damage was also recorded from the Snow Hill, Maryland, area where one field was reported to have over 75 per cent of the peppers infested. White potatoes were infested with the European corn borer on the eastern shore of Maryland. In Cullman County, Alabama, the insect was damaging sweetpotatoes.

Among livestock pests, the screw-worm continued very active in late September and early October. During the latter part of September, outbreaks of screw-worms were reported from Montgomery and Beaufort Counties, North Carolina. The predominant number of cases were in young animals. In Charleston County, South Carolina, screw-worm infestations were the worst in many years. Domestic animals were involved and the problem was serious in deer. One reporter counted 25 deer dead with screw-worms and several others affected in a small area in one day. Marlboro and York Counties, South Carolina, also reported cases. Lincoln County, Georgia, reported heavy infestations on cattle and that pests were a problem on range cattle in San Miguel County, New Mexico.

Soybean Cyst Nematode in Six States

THE soybean cyst nematode which was first found in this country in New Hanover County, North Carolina, in 1954 is now known to be in six southern states. Until 1956, the only known infestations were in the two North Carolina Counties of Pender and New Hanover, but in November of that year the pest was found in a soybean field in Lake County, Tennessee. Since then the nematode has been found in three additional Tennessee Counties, three Missouri Counties, two Arkansas Counties, one county each in Kentucky and Mississippi and one additional county in North Carolina. In July of this year, a Federal soybean cyst nematode quarantine was invoked to regulate the movements of host materials, commodities, or anything that constitutes a hazard of spread. North Carolina has had a state quarantine, and the other states

have or are developing quarantines. The quarantines and regulations are designed to contain the infestations of the soybean cyst nematode to the area where it is now known to occur.

Fall Armyworm Active

THE fall armyworm which has been one of the more active cereal and forage insects during the past several weeks continued to cause concern throughout a wide area of the country during late September and early October. In Delaware, the pest was common on corn throughout the state, being severe in late field corn in Kent County. Outbreaks were occurring in many parts of Virginia, particularly the eastern and southeastern areas where small grasses, milo, peanuts, and soybeans were the principal crops affected. Local infestations were reported from both North and South Carolina, while heavy damage to small grain was reported from parts of Georgia. Grain sorghums, small grains, grasses and sweet corn were heavily damaged by the fall armyworm in various Alabama counties. In Lee County, Alabama, some sweet corn was destroyed completely. Populations remained heavy in late September in several Louisiana parishes where millet, corn, sorghum, lawns and crabgrass were infested. Populations were on the decrease in Texas, but damage was reported from Lea County, New Mexico, where controls had been necessary. Infestations were spotty in Oklahoma, but newly emerged wheat in Jewell and Osborne Counties, Kansas was being damaged to the extent that controls might be used. Heavy damage to late corn was continuing in Missouri with one to six larvae per plant. Damage to scattered fields of early seeded barley and rye was reported also. In Ohio, the insect was abundant on late sweet corn throughout the state, being the most destructive in the southern areas.

Velvetbean Caterpillar in Delaware

THE velvetbean caterpillar was reported from Delaware in late September for the first time. Soybeans were being attacked in several loca-

(Continued on Page 107)



10,000 hours . . . only \$700 repair costs

Work record of first Michigan Tractor Shovel important since today's Michigans have same basic power train design

When the first Michigan Model 75A Tractor Shovel rolled out of Clark's Benton Harbor (Michigan) plant in 1954, company engineers *knew* it was good. But who could expect it to put in 10,000 working hours on a tough job . . . and still be "good enough to last many, many more years," (according to the satisfied owners, Indiana Farm Bureau's Indianapolis fertilizer plant). Five months a year, their "old" 1¼-yard Michigan Tractor Shovel operates on a *three-shift basis*—moving an average of 60,000 pounds of superphosphate and other materials *per hour* from storage piles to mixing units. It also handles mixed fertilizer, cleans spillage, and pushes freight cars.

Still has original tires, axles

In service equivalent to 5 years' normal 8-hour-a-day use, replacement parts have cost only \$700, according to Lewis Risinger, Master Mechanic. "And," he says, "we've *never broken an axle, or replaced a tire*, which is unusual in our operation. I need only three socket

wrenches to take the whole power-train apart—it's a fast, simple job that sure cuts downtime."

Operator praises power shift transmission

"I've noticed," says Plant Supt., Melvin Leach, "that whenever there's a choice, operators always pick the Michigan. Even a new man learns to operate it in a hurry." Operator Bob Jefferson especially likes the "power shift and steer, the bucket action, and the fact you don't have to 'grind' gears and wheels to keep close to the pile."

Liked the first—bought four more

Since he authorized purchase of this first Michigan Tractor Shovel, Ben Scharrer, head of the Bureau's Fertilizer Division, has bought four more Michigans for Bureau plants in Indianapolis and Jefferson, Indiana. "One of the things I've been pleased to see," says Mr. Scharrer, "is that there have been no changes in the basic Michigan design. Except for natural wear, the first

Michigan is as up-to-date as machines coming off the line today!"



6000th MICHIGAN NOW ON THE JOB

Michigan Tractor Shovel No. 6,000—produced a little over two years after the first one—is now at work for Ohio Gravel Co., Cincinnati. It has the same all-Clark "flywheel to drive-wheel" power train as do the first and all other Michigan Tractor Shovels.

Michigan is a registered trade-mark of
CLARK EQUIPMENT COMPANY
 Construction Machinery Division
 2463 Pipestone Road
 Benton Harbor 18, Michigan

In Canada: Canadian Clark, Ltd.,
 St. Thomas, Ontario

CLARK®
EQUIPMENT

WASHINGTON REPORT

By Donald Lerch



MOTIVATION research may well be called upon to fill in the voids as the agricultural chemical industry intensifies its marketing program. Forecasts of a continuing decline in acreage in major crops in the years ahead give added importance to the expanded marketing programs of the National Plant Food Institute and the National Agricultural Chemicals Association. These industry-wide efforts plus stepped up marketing programs of individual companies make sales the number one question industry faces.

The 128 question study for the National Plant Food Institute by the National Analysts Inc. probably is the biggest sales study of its kind ever undertaken. How useful it will be remains to be seen as the results are analyzed by the specialists, then reviewed by the Institute, and finally translated into action.

Important as it is, this is but one step in a broad program the Institute is undertaking to expand fertilizer consumption. Another significant move is the one year grant in aid the Institute has placed with Purdue University to get more facts and figures on the economics of fertilizer usage from the farmer's point of view. Fertilizer recommendations of colleges often are made in pounds per acre, with little available data on the expected yield increases, and even in those cases where this data is available, there's little information on the additional income that can be expected. These are things the farmer supposedly is able to read in recommendations, but the farmer's buying habits indicate he doesn't do it.

The National Agricultural Chemicals Association is rifling its

resources at specific targets for pesticide manufacturers. The next issue of the NAC news will be aimed at forest pest control . . . part of NAC's program of developing new markets for its members. As general inflation changes forestry economics, the need for pest control in commercial forest lands increases. Also, the concept of "tree farming" is spreading from coast to coast, and more attention is being given to protection of the forest for continuous yield. The National Plant Food Institute likewise is promoting the use of fertilizer in forest management with much the same reasoning.

Another move to broaden markets will be the NAC Foreign Trade Committee's proposed meeting with top public relations and media officials from Brazil, Japan, and Ceylon later this year. This Washington meeting will give industry a chance to broaden its beachhead.

Despite these efforts, industry men in Washington see the pressure on sales continuing and intensifying. If this happens, the doctors of industry's psychology clustered around the motivation research banner may be called upon to diagnose the problem and recommend a cure. Curiously enough, some unpublished studies where motivation research has been at least a factor, show that many farmers have little tie with the recognized channels of communication from agricultural colleges and experiment stations. Many farmers hold a dim view of the so-called college and U.S. Department of Agriculture experts. This, despite the fact that agriculture today is based on farmers who have been educated through the land-grant college system.

This is not to belittle the importance of agricultural colleges, because undoubtedly official recommendations have an influence on quite a number of farmers. However, a considerable group of farmers consider themselves the experts. After all, the individual farmer with his investment of land, labor, and capital is considerably closer to agricultural production than a scientist working on a minute phase of agriculture, or a county agent on a salary who is not faced with the problem of making a living from his land or animals.

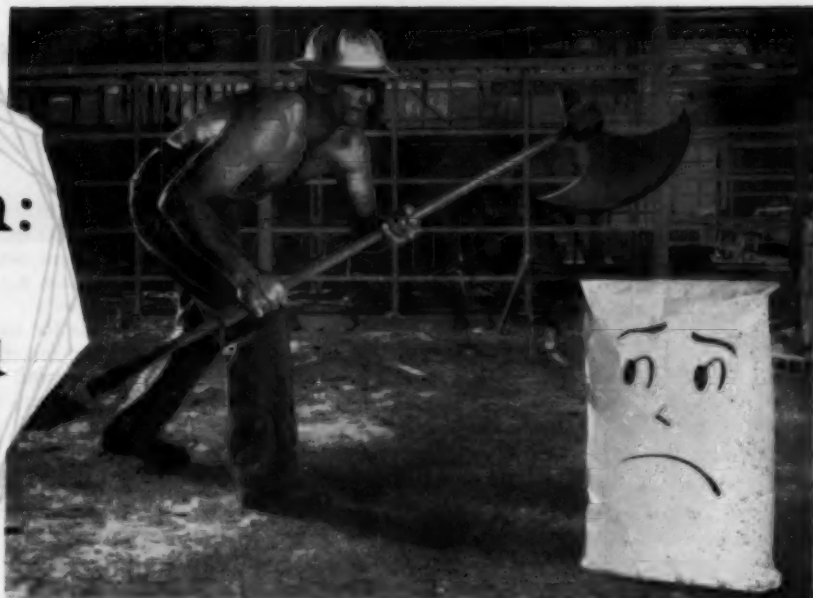
In short, Washington farm experts and those elsewhere may well be surprised at what farmers really think of them, and how farmers accept their recommendations. Probably this attitude cannot be obtained from the usual type of farm survey. When asked a question directly, most farmers would praise the county agent and the college specialist. People tend to give surveyors the answers they believe the surveyor wants to hear. Also, people tend to give answers which establish their position as knowledgeable, progressive individuals who are successful leaders in the community.

Certainly no one in Washington wants to upset the basis of our agricultural educational system. Industry, however, may have to make certain adjustments in order to make a profit on the money it invests in producing and marketing chemicals and pharmaceuticals to agriculture. Motivation research may be a useful tool.

Battle lines are being formed to revise the nation's farm program. Regardless of the outcome next year,

(Continued on Page 105)

Problem:
"Freeing"
imprisoned
products



It's no easy job to open and empty ordinary paper bags that contain chemicals and rock products such as cement. Hard-to-open bags consume time . . . multiply handling costs . . . and retain a wasteful residue of the product after emptying.

**Fulton's
Solution:**
Bags that zip
open in an
instant



Ful-Zip® multiwall paper bags—with built in rip-cords—zip open like a pack of cigarettes. These bags can be turned inside out for complete emptying . . . reduce labor time . . . and cost only a fraction more than regular bags.

For your packaging or protection problem . . .

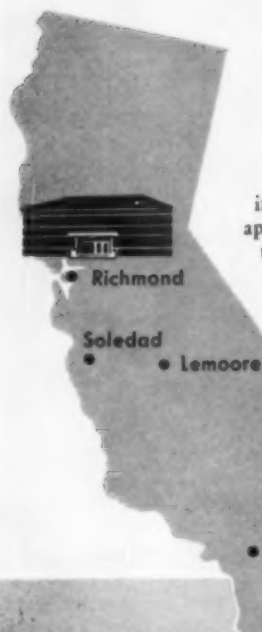
Let our Special Services Division show how Fulton products can answer your requirements. We manufacture a complete line of multiwall paper and textile bags, industrial fabrics and made-up textile items. Write: 1416 Annunciation Street, New Orleans, La.



ATLANTA • CHICAGO • DALLAS • DENVER • KANSAS CITY • MINNEAPOLIS
NEW ORLEANS • NEW YORK • OKLAHOMA CITY • PHOENIX • ST. LOUIS • SAVANNAH

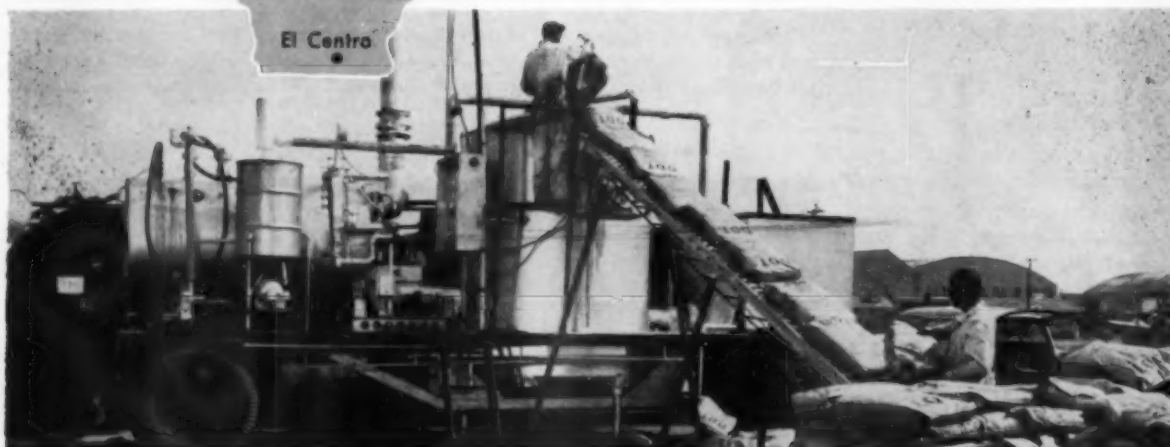
NOVEMBER, 1957

United-Heckathorn chemical manufacturing and application facilities in key agricultural areas provide first complete local service



United-Heckathorn permanent or portable plants manufacture insecticides, fertilizers, weed killers, fungicides and fumigants on location and offer aerial or ground application service. The portable plants may be transported to your job site. Both types are scale versions of United-Heckathorn main Richmond, Calif., plant with its research, development and control laboratories . . . vast facilities for mixing, grinding, blending of dry materials and liquids for bulk sales, custom processing, private label packaging . . . engineering for construction and maintenance of specialized processing and application equipment. United-Heckathorn, Richmond or any of the affiliated plants are at your service and invite your call.

UNITED Heckathorn



Portable plant compounding chemicals for aerial spraying of beet leaf hopper on 250,000 acres of Kettleman Hills, Calif.



Main Laboratory, Richmond. Chemists, machinists and other technical supervisory personnel accompany field jobs.



Extensive ground application work and chemical sales at Soledad, Calif., in the center of the "Salad Bowl" Salinas Valley.



Packaging and delivery for sales of agricultural chemicals for citrus crops, Corona, Calif.



Formulation and application, aerial and ground, in Imperial Valley, the world's largest vegetable growing center.



Formulation of dry & liquid insecticides for San Joaquin Valley, Lemoore plant near Fresno, center of cotton, potato & grape areas.

UNITED-HECKATHORN

Main office and plant: 600 S. Fourth Street, Richmond 4, Calif.

Phone: LAndscape 5-9210

Plants at Soledad, Corona, El Centro, Lemoore

TECHNICAL SECTION



Cure For Hops Disease

"Agri-mycin 100"; a combination of streptomycin and oxytetracycline, has been found by scientists at Oregon State College to be extremely effective in the control of downy mildew in hops plants.

In a paper presented during the American Phytopathological Society meeting at Stanford University, Aug. 25 to 29, C. E. Horner and C. R. Maier of Oregon State's Agricultural Experiment Station stated that "when adequate amounts of the antibiotic streptomycin are absorbed by hops plants, disease infection is successfully eliminated, thus transforming stunted infected shoots into normal, healthy crop producing vines."

Control of this disease with conventional fungicides, they indicated, has not been satisfactory because these agents are costly to apply by dusting or spraying and are not absorbed to reach internal infection.

In the tests 85 per cent effectiveness was obtained by two applications of a spray containing 1000 parts per million of streptomycin. The first application, the scientists said, was made after crown pruning but before vine training. The second was made a few days after the first vine trainings.

Adsorption of Diluents

Experiments have been conducted to study the adsorption of several chlorinated organic insecticides and related compounds on the surfaces of typical insecticide-dust diluents and carriers.

Solutions of known concentrations of the insecticides and related compounds in a total of 50 milliliters of organic solvents were prepared.

A weighted amount of the diluents was added and the amount of insecticide adsorbed was calculated from the difference between the initial and the final concentration.

Adsorption of DDT, DDE, methoxychlor, methoxy-DDE and DDA was measured on typical diluents and carriers. The amount of adsorption varied with the type of diluent or carrier and the type of insecticide or related compound.

During the experiments on adsorption, two types of reaction of methoxy-DDE and methoxychlor were observed on the surfaces of the diluents. They were color development on the surface and catalytic change. Reaction occurred on three diluents. These were Panther Creek Bentonite, Diluex A, and Barden Clay. Comparisons of the amount of reaction on different diluents indicated that this reaction is correlated with the presence of acid sites on the surface of the materials.

Adsorption of DDT, Methoxychlor and Some Related Compounds on Insecticide Dust Diluents and Carriers by Donald E. Weidhaas. Pages 429 to 435, *Journal of Economic Entomology*, Volume 50, No. 4, August, 1957.

Animal Virus Isolated

The Department of Agriculture announced recently that scientists at the Plum Island Animal Disease Laboratory had purified, isolated and photographed the foot-and-mouth disease virus. Plum Island is off Orient, L. I. The new findings about the physical make-up of the foot-and-mouth disease virus are expected to speed research in the development of new means of combating the disease.

Gibberellic Acid Report

Gibberellic acid investigations at the Department of Vegetable Crops of Cornell University, are being conducted in both greenhouse and field studies with beans. The objective is to make the bean stem grow taller before flowering so that pods of dry and snap beans will be higher on the plants and facilitate direct combining and mechanical harvesting. It is too early as yet to draw conclusions, and the department is still testing different methods and times of application.

In general, the field results have been moderately favorable, but not as striking as greenhouse results. While the chemical stimulates elongation of the plant soon after treatment, the long term effect seems to be inhibitory to total growth, at least with some treatments. E. B. Oyer, *Cornell Veg. News*, Vol. 8, No. 3, July, 1957.

Phosphate Ore Fertilizer

A process for the production of fertilizer from Florida leached-zone ore—a low-grade, high-alumina phosphate ore—has been developed by the Tennessee Valley Authority at Wilson Dam, Ala.

In the process the ore was calcined and then extracted with a mixture of nitric and sulfuric acids. After filtration, the extract was processed into fertilizer by continuous ammoniation and granulation.

Typical grades of fertilizer that can be made with this process are 15-15-15, 20-20-0, and 11-22-11. The products are well granulated, do not cake in storage, and have a satisfactory agronomic value. The process also provides an opportunity for recovery of uranium from the ore.

Soil Stabilizing Agent

Use of phosphoric acid as a soil stabilizing agent in construction projects may overcome problems of heavy clays, according to an announcement by the research department of Monsanto Chemical Company's Inorganic Chemicals Division.

"Chemical stabilization of highway subgrades and base courses seems to hold great promise for development in the near future," M. J. Scott, assistant director of research for the division, pointed out. "Such factors as the vastly increased volume of highway construction, more stringent design requirements for all types of roads and growing shortages of select soils and aggregates have expanded the need for additives to alter soil properties for road building purposes," he said.

Clay soils, when dry, exhibit exceedingly high bearing strengths and would be suitable for subgrade or base course construction. When wet, however, the soil structure expands considerably and much, if not all, of the bearing strength is lost.

Monsanto experiments have shown that if two per cent of phosphoric acid is added to a fat plastic clay and the material compacted, a hard, durable mass is produced that will withstand prolonged exposure to water and to wintering. When a second material, such as Monsanto's Amine ODT, is added, an even more stable soil results.

Control of Cabbage Pests

Increasing resistance of cabbage worms to DDT is being met by new insecticides, thus aiding growers of cabbage, cauliflower, and broccoli to meet a serious threat to their crops, according to Dr. F. L. McEwen, Cornell and State University entomologist at the Experiment Station.

"Since 1951 there has been a progressive decrease in effectiveness of DDT against cabbage worms, especially the cabbage looper," says Dr. McEwen. "Spray programs which provided almost 100 per cent control in 1950 gave 60 per cent in 1953 and 45 per cent in 1955. While poor application and improper timing

might account for some of this, it has become quite clear that the cabbage looper at least is developing resistance to DDT."

Just how an insect develops resistance to a pesticide is not known, but it is probable that widespread use of DDT permitted the survival of only those cabbage worms tolerant to it, explains the Station scientist. "These tolerant worms, although rare in 1945, became the ancestors of more than 50 per cent of the cabbage loopers of 1955," he adds.

"Fortunately the insecticide industry was not content with DDT and its relatives and since 1945 has

been developing additional new materials," continues Doctor McEwen. "Many of these have been under test at the Experiment Station, with the result that worm-free cabbage, cauliflower, and broccoli is now possible with new pesticides and a revised spray program.

"Outstanding in current control work is endrin which is not only highly effective but quite persistent. Endrin can be used until head formation, when less persistent materials must be substituted. Phosdrin is also proving highly effective for near-harvest control of cabbage worms."

BOOK REVIEW SECTION

Advances In Pest Control Research, Volume I, edited by R. L. Metcalf. Published by Interscience Publishers, Inc., New York. 514 pages, \$11.

The subject matter for Volume I has been selected from recent pest control research trends and emphasizes the fundamental aspects of pest control. Contributors for this first volume of a series, which is expected to become a continuing reference work for research workers, teachers, and students, include: J. M. Barnes, Medical Research Laboratories, Surrey, England; R. F. Brown, Army Quartermaster Research and Engineering Center, Natick, Mass.; T. R. Fukuto, Department of Entomology, U. of California; James G. Horsfall, The Connecticut Agricultural Experiment Station, New Haven; and W. E. Ripper, Fisons Pest Control Ltd., Cambridge, England.

Among the chapter headings are: Control of Health Hazards Associated with the Use of Pesticides, The Chemistry and Mode of Action of Herbicides, Mechanisms of Fungitoxicity, Chemical Analysis of Pesticide Residues, and The Status of Systemic Insecticides in Pest Control Practices.

Chemistry of Plants by Erston V. Miller. Published by the Reinhold Publishing Corp., New York. 174 pages, \$4.75.

This book is an up-to-date analysis of the chemical constituents of plants. The latest developments in plant chemistry are covered and a final chapter brings attention to the present frontiers of research in the chemistry of plants.

Included are chapters on glycosides, alkaloids, carbohydrates, proteins and other nitrogen compounds, lipides, pigments, enzymes, organic acids, and minerals.

The book should have great reference value to research workers in agriculture as well as organic chemists and specialists engaged in manufacturing agricultural chemicals.

Dr. Miller's experience includes twenty years as a plant physiologist with the U. S. Department of Agriculture conducting research on the physiology and biochemistry of horticultural crops. He is now research professor of botany at the University of Pittsburgh and is also a consultant for the Florida Fruit and Vegetable Growers Association.

Comprehensive Inorganic Chemistry, Volume Six. The Alkali Metals by John F. Suttle and *Hydrogen and Its Isotopes* by Robert C. Brassted. Published by D. Van Nostrand Co., Inc., Princeton, N. J. 234 pages, price \$6. This is the sixth volume of a planned eleven-volume reference work on the chemical elements and their inorganic compounds.

A METHOD OF SOLVING GRANULATION PROBLEMS

PREDICTS EFFECT OF VARIOUS FACTORS ON LIQUID PHASE

Nitrogen Division Research Laboratories are developing information which can be used to predict the effect of changes in raw materials, water content, ammoniation rate, and formulation on the liquid phase of granular mixed fertilizers.

Information on how the liquid phase varies in a mixed fertilizer with changes in operating conditions and raw materials can be very useful, especially to the manufacturer faced with the problem of deciding which raw material or formulation to use for a given grade of fertilizer.

Formulation Changes Necessary

The fertilizer manufacturer of today must make many changes in formulation due to variations in costs and availability of raw materials, and because of the demand for many new higher-analysis grades. The frequency of these changes points directly to the need for some method to predict their effect on processing and product quality. Because most of the factors that affect the processing characteristics of a mixture and the end product quality are related to the liquid phase, an understanding of

how this factor varies under different conditions is highly desirable.

The first step in determining the liquid phase of a granular mixed fertilizer is to predict the soluble salts in the fertilizer from the composition of the raw materials and the reactions that occur during processing. A measure of the liquid phase is then determined by holding a mixture of these soluble salts and water found in the final product at constant temperature, separating the liquid from the excess solids, and analyzing for water to determine the ratio of water to salt present in the liquid phase.

Research Program Organized

Using this method, Nitrogen Division recently organized a research program to study the effects of changes in liquid phase on the manufacturer of granular mixed fertilizers. The study covered a wide range of formulations, raw materials, and grades. This involved a great deal of laboratory work to determine the liquid phase relation for a number of complex salt systems found in mixed fertilizer. An electronic computer was used for the lengthy calculations in-

volved in formulating and predicting product composition.

Application of Data

Data from this study is proving extremely valuable in explaining many observed differences in the storage and handling characteristics of various granular mixed fertilizers.

Nitrogen Division's work indicates that there is little place for generalizations in solving problems encountered in granulating mixed fertilizers. While two problems may appear to be the same, a close analysis may show that due to the difference in only one factor, the answers to the problems are entirely different.

Perhaps you are encountering mixing or conditioning problems in the manufacture of a concentrated or granular fertilizer. All of this recent data obtained by Nitrogen Division is now available to help you. Why not call on experienced Nitrogen Division technical experts for assistance? These men will help you in predicting the effect of changes in raw materials and processing conditions on your fertilizer manufacturing operations. It will pay off in a better, more profitable plant operation.



**TONNAGE
OPPORTUNITIES**

FERTILIZING SMALL GRAINS FOR COLD WEATHER GRAZING

Grazing cattle on small grains during cold weather has been a common practice in the South for many years. Southern farmers discovered a long time ago that proper fertilization of small grains will produce fall, winter and early spring grazing plus a grain crop later.

Lately the practice has been spreading to colder climates. Experiment stations are testing it and farmers are trying it. Wherever it proves profitable, it expands fertilizer markets and helps to make the fertilizer business more of a year-round business.

Even in the Northeast, farmers are getting extra weeks of nutritious grazing from better-fertilized small grains. New, hardier varieties of winter oats are now being grown north of the Mason-Dixon line. New, vigorous strains of rye and Hessian-fly-resistant wheat make early and late seedings of grain a better bet to produce both grazing and a grain or cover crop.

In California, wheat experts are perfecting a perennial wheat which, with heavy fertilization, should produce two or more years of grain, followed by more years of good grazing—all from one seeding.

When experiment stations recommend grazing small grains they advise heavier fertilization. This means more mixed fertilizer at seeding and larger quantities of nitrogen or mixed fertilizer as top-dressing.

Extra fertilizer pays several ways. For fall grazing, it encourages earlier growth of lush, nutritious green feed. It keeps the grain growing later into the fall, as cold weather is offset by readily avail-

able plant food. Earlier stooling out and heavier growth with fertilizer assure good ground cover and strong roots to carry the grain crop through the winter after part of the foliage has been grazed off. Extra fertilizer also encourages earlier growth in late winter and spring.

Spring Fertilizer Needed

Tests as far north as New Jersey show that fertilized winter wheat produces a better yield of grain if the heavy fall growth is grazed down. Spring grazing, however, must be carefully controlled, and extra fertilizer applied, to assure a good grain harvest after grazing.

Fertilizer helps small grains produce feed with high nutrient value and beef cattle, dairy cows and other livestock love it. It helps provide low-cost feed for many weeks when no other grazing is available. By producing two crops

from one sowing, it cuts labor costs and increases total yields per acre. On fertile soils, grazing also reduces lodging and makes grain harvest easier.

Cropping methods vary from South to North, but the extra fertilizer is needed everywhere. Small grains seeded in sod, and following cash crops, are typical through the South and in many specialized crop areas. Further North, some farmers sow spring oats in early fall to provide good grazing until hard frost. They may sow rye, winter oats or wheat late, to get early spring grazing along with a grain crop. Or they may combine an oats seeding for fall feed with a winter grain for spring grazing plus a grain harvest.

Increased grazing of winter grains is building fertilizer markets. As livestock production expands, and farmers search for efficient new ways to grow feed, new sales opportunities develop for fertilizers.

Valuable New Book For Fertilizer Men

"SOIL" the 1957 Yearbook of Agriculture, recently published by the United States Department of Agriculture, is packed with timely and useful information helpful to everyone concerned with the manufacture and sale of fertilizers.

Fertilizer agronomists and salesmen will find this book a valuable aid in assisting their farm customers to obtain greater benefits from the proper care and fertilization of soils. It is non-technical and easy to read and understand.

The book concentrates on efficient soil management and presents new and

comprehensive information on this subject. Of particular interest to fertilizer men are the sections on nutrient needs, fertilizer manufacture and use, major and secondary plant foods, trace elements, fertilizer application, fertilizer economics, etc.

This 784-page volume is a veritable treasure house of facts that every fertilizer man should know. Available at only \$2.25 per copy from Superintendent of Documents, Government Printing Office, Washington 25, D.C. It's so popular the supply will probably be exhausted fast.

How To Sell Yourself On **ADVERTISING**

To convince yourself that your company needs to advertise, it will pay you to use many of the same arguments that convince a farmer that he needs to fertilize. The function of advertising is very similar to the function of fertilizer.

Fertilizer grows crops, advertising grows sales. Both are great multipliers; they multiply success. Neither fertilizer nor advertising is a cure-all. Everything else essential to the end result must be functioning properly to get the greatest benefit from fertilizer or advertising.

To produce the best returns with fertilizer, the farmer must start with good seed. He must cultivate his field properly. He must protect his crop from insects. He must have reasonably good weather conditions. He must have some one there to harvest his crop when it's ready for picking.

To produce the best returns from advertising, the business man must start with a good product. He must cultivate his market properly. He must protect himself from competition. He must have reasonably good economic conditions and he must have salesmen out asking for orders.

To produce bigger sales, advertising must be used in the proper balance and in the right amounts at the right times, just as fertilizer must be used in the right balance in the right amounts at

the right times to produce bigger crops.

It's just as difficult to sell advertising to a business man who has never used advertising and doesn't believe in advertising as it is to sell fertilizer to a farmer who has never used fertilizer and doesn't believe in fertilizer.

The easiest man to sell fertilizer is a man who has used a lot of it over a period of years and has discovered what it will do for him. The same is true of advertising.

There is just as much prejudice against advertising among business men as there is prejudice against fertilizer among farmers. Most of the criticisms that have been leveled against advertising by business men have also been used against fertilizers by farmers: "It's too expensive. I can't afford it. It's a necessary evil. I can remember when I produced all the profits I needed without it. Lots of folks get along all right without it. Think how much more I would make if I could save that money."

Some farmers are convinced that fertilizers are no good because they have used 100 pounds per acre without seeing any results. Some business men are convinced that advertising is no good because they have used small amounts in a big market without seeing results.

There has been far more money wasted by using too little fertilizer than by using

too much fertilizer. The same is true of advertising. You have to use a very heavy application of fertilizer per acre before you reach the point of diminishing returns. The same is true of advertising.

When a farmer uses plenty of fertilizer and gets a big crop, fertilizer seldom gets credit for it. He's just a good farmer with plenty of money. When a business man uses plenty of advertising and gets big sales, advertising seldom gets credit for it. He's just a good business man who knows how to hire good salesmen.

You can condition a market by plowing in advertising just as you can condition a soil by plowing in fertilizer. You can build a better farm with fertilizer. You can build a better business with advertising.

The crop-producing power of the soil will soon disappear if you stop using fertilizer. Consumer demand for your product will soon disappear if you stop advertising. You have to keep replenishing your market with advertising, just as you have to keep replenishing your soil with fertilizer.

When the farmer uses enough of the right fertilizer at the right times, he gets a far greater return from all of his other investments and efforts. The business man can get exactly the same results from properly-directed advertising used in sufficient quantities.



NITROGEN DIVISION, ALLIED CHEMICAL · SUPPLIERS OF NITROGEN TO THE FERTILIZER INDUSTRY

MIXED FERTILIZER POSTER

Large posters similar to this in full color are now appearing on hundreds of billboards in leading farming areas. Small, full-color reproductions are available as long as the supply lasts, first come first served. Request these (11 inches long or 30 inches long) from Nitrogen Division, Allied Chemical, 40 Rector St., New York 6, N. Y. Can be used as window streamers or posters. Supply is limited; order early.

HERE'S THE BIG LINE OF

Arcadian

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get technical assistance and formulation advice from the largest and most efficient staff of nitrogen experts. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %					PHYSICAL PROPERTIES			
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 100°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	26
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.188	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.052	48	-52*
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
10	44.4	24.5	56.0	10.0	9.5	11.0	1.108	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.081	25	-7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.925	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.972	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	—

Other ARCADIAN® Nitrogen Products: UREA 45 • A-N-L® Nitrogen Fertilizer Ammonium Nitrate • American Nitrate of Soda • Sulphate of Ammonia

NITROGEN DIVISION Allied Chemical & Dye Corporation

MAIN OFFICE: 40 RECTOR STREET, NEW YORK 6, N. Y., PHONE HANOVER 2-7300

Hopewell, Va., P. O. Drawer 131.....Cedar 9-6301
Ironton, Ohio, P. O. Box 98.....Ironton 8-4366
Omaha 7, Neb., P. O. Box 166.....Bellevue 1464
Raleigh, N. C., 16 W. Martin St.....Temple 3-2901

Columbia 1, S. C., 1203 Gervais St.....Columbia 3-6676
Atlanta 3, Ga., 127 Peachtree St., N. E. Jackson 2-7805
Memphis 9, Tenn., 1929-B South 3rd St. Whitehall 8-2692
Columbia, Mo., P. O. Box 188.....Gibson 2-4040

Indianapolis 20, Ind., 6060 College Ave. Clifford 5-5443
Kalamazoo, Mich., P. O. Box 869.....Kalamazoo 5-8676
St. Paul 4, Minn., 45 N. Snelling Ave.....Midway 5-2864
San Francisco 4, Cal., 235 Montgomery St. Yukon 2-6840

NEWS about the TRADE



Form Dixie Chemical Corp.

The Dixie Chemical Corp., Albany, Ga., was formed last month by a group in the Southeast. The announced function of Dixie Chemical will be to purchase, sell, and distribute chemicals of all types for agricultural use.

Those actively engaged in the management of Dixie include: Myron Maxwell, Maxwell Insecticide Co., Gary, N. C.; W. H. Tiller, Southern Agricultural Chemicals, Kingstree, S.C.; A. B. Collins and J. W. Patrick, Orange State Chemical, Orlando, Fla.; and C. W. Walker and O. H. Blanton, Walker Fertilizer Co., Albany, Ga.

Mr. Blanton has been elected president, Mr. Tiller is vice president, and Mr. Patrick is secretary-treasurer of the new firm.

Southern Control Meeting

The Association of Southern Feed & Fertilizer Control Officials will meet June 9 to 11, 1958, at the Heart of Atlanta Motel, Atlanta.

R&H Acquires Vapam Rights

Rohm & Haas Company has been granted foreign manufacture and sales rights to Vapam soil fumigant, it was announced by Stauffer Chemical Company, the owner of the patents and trade mark on this new product. Vapam is Stauffer's brand of sodium methyl dithiocarbamate soil fumigant.

The license covers all foreign countries except U.S. possessions, Belgium, Luxembourg and the Netherlands. Under the agreement, Stauffer will supply Rohm & Haas and its

affiliated and subsidiary companies with technical information and guidance for the manufacture, application and use of the new soil fumigant under Stauffer's patents. Rohm & Haas will also be granted the right to sell the product under the Stauffer trade name Vapam in the territory licensed to it.

Nott Co. Acquires Rose

The Nott Manufacturing Co., Mount Vernon, N. Y., has acquired control of the Rose Manufacturing Co., Beacon, New York, manufacturers of the "Tri-Ogen" line of rose sprays and rose food.

Nott president Bob Harkins stated that the acquisition of Rose is part of Nott's general expansion program to offer its distributors a full and complete line of nationally established brands of insecticides, fungicides, herbicides, specialty fertilizers, rodenticides and allied products.

Herb Harkins, who has been actively associated with the Nott organization, has been elected president of Rose.

Midget Insecticide Aerosol

The Fairfield Chemical Division of the Food Machinery and Chemical Corp., New York, has developed a midget insecticide aerosol which contains only two ounces of highly concentrated active ingredients, but has the performance equivalent to that of a conventional aerosol.

A little larger than a fat cigar, the midget aerosol is operated by a metered valve, which permits the dispensation of only one-sixth the amount of insecticide required by the larger aerosols for insect control.

Wyoming Control Conference

The 13th annual Wyoming Weed and Pest Control Conference will be held Nov. 12 and 13 at the Cody Auditorium, Cody, Wyo.

Slipiec, A Geigy Rep.

Mr. Roy E. Slipiec has recently been named midwest sales representative of Geigy Industrial Chemical Division of the Geigy Chemical Corporation, Ardsley, New York. His sales headquarters are located at 629 West Washington Boulevard, Chicago.

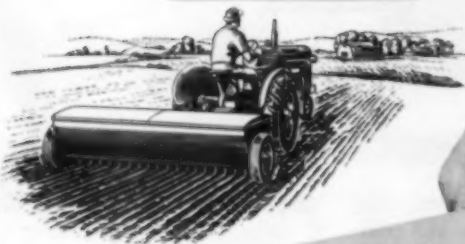
Mr. Slipiec was formerly associated with the Gallowhur Chemical Corporation of Ossining, New York, and the Movidyn Corporation of Chicago. He is a veteran of World War II.

Offers Eymann Process

The National Potash Co., New York, has been granted the exclusive right to authorize the use of the Eymann batch granulating process in the fertilizer industry.

The process was developed by Lewis Eymann, president and co-owner of the North-Ag Chemical and Supply Co., Forest City, Iowa. Two plants have been using this process for almost a year, and both have reported excellent results. Production with one-ton mixers ranged from 12 to 20 tons per hour with grades from 3-12-12 to 5-20-20 to 10-10-10.

The principal advantage of the process, National Potash said, is the low capital investment it requires. In most plants already producing pulverized fertilizer, conversion to the Eymann process can be made for under \$5,000.



GRANULAR



TRIPLE SUPERPHOSPHATE

For Direct Soil Application

As in all U. S. Phosphoric Products, Granular Triple Superphosphate is produced under the most exacting chemical and physical controls to furnish you and your customers a product of consistent uniform particle size, completely dust free with low moisture content that will not cake or lump in storage or bridge over in the hopper. It drills free to provide the desired amount of plant food through even, uniform flow and distribution.

GUARANTEED 46% A.P.A.

Available in
Bags or Bulk

There's a **BRADLEY & BAKER** office near you. Their representative would be pleased to consult with you on your requirements and to advise on your most convenient delivery routings.

RIGID QUALITY CONTROL
Through Six Basic Chemical and Physical Analysis

HIGH WATER SOLUBILITY
High Water Solubility is a Characteristic of all 3 Grades

RUN-OF-PILE
Fine Texture, Highest Porosity, Large Surface Area, Small Particle Size, for Maximum Ammoniation-Granulation.

GRANULAR
Dust Free, Free Flowing, Uniform Particle Size, Medium Hardness, No Bridging Over, for Direct Soil Application.

COARSE
For Intermediate Ammoniation to Produce a Semi-Granular Product. Also Affords Excellent Compatible Mixing with Granular Potash, for Minimum Segregation, in Alkaline Grades.



**U.S. PHOSPHORIC
PRODUCTS**
TAMPA, FLORIDA

Division
TENNESSEE



CORPORATION

SALES AGENT:
BRADLEY & BAKER

133 East 44th Street—New York 17, New York

DISTRICT SALES OFFICES:

Atlanta, Ga.

Indianapolis, Ind.

St. Louis, Mo.

Norfolk, Va.

Bailey Marks Anniversary



L. H. Bailey, Inc., New Orleans, celebrated the first anniversary of its incorporation last month. L. Horace Bailey is president of the firm which sells bulk chemicals for agriculture and industry in southern Louisiana and Central and South America.

Mr. Bailey, who formed the company a year ago, had worked with the New Orleans office of the Thompson Hayward Chemical Co. from 1935 to 1953 and was with the Hemisphere International Corp., New Orleans, from 1953 until 1956. He reports that business conditions are good in his area and his sales volume is increasing regularly at quite a satisfactory rate.

To Review Weevil Progress

Progress of boll weevil and cotton plant research will be reviewed at the third annual Beltwide Cotton Production Conference at the Peabody Hotel, Memphis, Tenn., December 12-13.

The conference is sponsored by the National Cotton Council in cooperation with Cotton Belt land-grant colleges, U. S. Department of Agriculture, agricultural chemical industry, farm organizations, and others.

A highlight of the opening session will be a report on the findings and recommendations of the Cotton Task Group of the Presidential Commission on Increased Industrial Use of Agricultural Products. Production research implications will be emphasized.

Other subjects on the program are variety improvement, obtaining uniform stands, disease control, fertilization, insect control, weed control, skip-row planting, and effects of current practices on spinning performance of fibers.

Special technical meetings on insect control, disease control, defoliation, and cotton genetics and breeding will precede the conference.

Calumet Producing Ammonia

Calumet Nitrogen Products Co., Chicago, has started large-scale production of ammonia for use in farm plant foods and by industry at its new plant in Hammond, Ind.

With a capacity of 300 tons a day of anhydrous ammonia the plant

operates in conjunction with a nitric acid plant and an ammonium nitrate solutions plants on a 24-acre site north of the Calumet ship canal in Hammond. About 100 tons a day of the anhydrous ammonia is being converted into nitrogen solutions.

Chemagro Names Bricker

William H. Bricker has been appointed sales representative for Chemagro Corporation in Michigan, Ohio and the eastern portions of Indiana and Kentucky.

Mr. Bricker previously served as branch manager for the California Spray Chemical Corp. in the midwest region. His Chemagro regional headquarters have been established in St. Joseph, Michigan.

Cleve H. Tandy Dies

Cleve H. Tandy, Chairman of the Board of the Port Fertilizer and Chemical Company of Los Fresno, Texas, died at his home near Brownsville, Tex., October 18. He was 62 years old.

He had been in ill health for some time but had continued to be active in business and civic affairs until his death.

Named Midwest Agronomist

James L. App has been named midwest agronomist for the Virginia-Carolina Chemical Corp., Richmond, Va.

He will be located in Dubuque, Iowa, and will offer technical assistance. Mr. App will conduct fertilizer meetings, promote soil testing, and work closely with other agronomists and extension men in the Midwest.

Ansul To Build Addition

The Ansul Chemical Co., Marinette, Wisc., has started construction of an addition to its disodium methyl arsonate manufacturing facilities. Completion of the 3,000 square foot, \$40,000 building is scheduled for late fall.

According to Ansul the increased demand for disodium methyl arsonate has made the new plant addition a necessity. The new plant will enable Ansul to double its annual output of disodium methyl arsonate.

Named V.P. of O. M. Scott

Frederick M. Smith has been elected vice president of O. M. Scott & Sons, Marysville, Ohio. Mr. Smith has been manager of the Eastern Division of the firm since 1935 and director of its Cranbury, N. J., Turf Research Center.

18th Aviation Trades Meet

The 18th annual convention of the National Aviation Trade Assn. will be held at the Adolphus Hotel, Dallas, Texas, on Nov. 13, 14, and 15, for commercial air service operators and aerial applicators.

Among the subjects to be discussed by aerial applicators at the meeting are: safety matters, contract operations, regulations, and the NATA 1956 "Ag" survey. A vice president and chairman for agricultural activities for 1958 will be named at the meeting for recommendation to the NATA nominating committee.

Koehring Buy-Back Plan

A "Buy-Back" plan, intended to increase the availability of bank credit for contractors and other customers has been announced by the Koehring Co., Milwaukee. Under the plan, Koehring will underwrite credit arrangements negotiated between the equipment buyer and his bank.

A descending scale of values has been set up at which Koehring will repurchase the equipment if the buyer defaults in his payments to the bank. As a result of the new credit support plan, Koehring products will have resale market valuation to lending banks similar to that obtained when they finance buyers of trucks.

Mouse Control Guide

The Wisconsin Alumni Research Foundation, Madison, Wisc., reports that they have distributed more than 92,000 copies of the booklet on rat and mouse control issued by the foundation and its warfarin licensees.

Requests have been received from all states in the Union where the rodent problem is important from those in charge of agricultural education, and from those responsible for advising the farmer on such matters as rodent control.

Aerial Application, Weed Control Problems Highlight Beltwide Cotton Mechanization Conference Held October 2-4 in Shreveport

INCREASED engineering and biological research is a must if the whole range of agricultural chemicals are to be used to their best advantage, a U.S. Department of Agriculture research specialist told the Beltwide Cotton Mechanization Conference at Shreveport, La., Oct. 2 to 4.

Kenneth Messenger, in charge of the Aircraft and Special Equipment Center at Beltsville, Md., said that great strides had been made in the proper application of these chemicals, but pointed out that much more remains to be done.

About one-fifth of the nation's agricultural land is treated by aircraft, Mr. Messenger said, but almost all of the planes used were originally designed for purposes having no relation to agriculture. He predicted that the days of these aircraft are numbered, as far as agricultural use is concerned, and that they will be replaced by aircraft designed especially for agricultural work.

Mr. Messenger said that there also are problems in ground application methods. Certain chemicals perform well in one applicator but are inefficient in others. "Much remains to be done in designing air-nozzle configurations suitable for the treatment of some crops," Mr. Messenger told the conferees, "but from the evidence available it appears that the air-blast principle for applying sprays has a promising future."

Equipment with a high standard of precision will be required to an increasing degree in the future, he said.

Claude L. Welch, director of the production and marketing division of the National Cotton Council, led the speakers in a weed control session at the meeting. He said that even if the U.S. cotton industry could achieve a much larger market with present cost structures, it is doubtful if the

industry could hold that market unless the weed control bottleneck is broken.

Additional acreage would mean more weed control, he said. Under these conditions it is almost certain that labor will not only be more scarce but more expensive as well. Mr. Welch called for research "to move the weed control stumbling block out of the way." Many costs and losses that may be properly charged against weeds go considerably beyond the direct costs of labor and materials, he pointed out.

Weeds lower the quality in cotton and this, in turn, is reflected in increased costs. They hamper mechanical harvesting by reducing packing efficiency and causing excessive "down time." Weed trash harvested with seed cotton results not only in downgrading of the lint and lower prices to the producer, but added headaches for the ginner and eventually the spinner.

Weeds were cited also as the biggest worry irrigation has brought to the humid area of the Cotton Belt by Rex F. Colwick, coordinator of the regional cotton mechanization project at State College, Miss.

Mr. Colwick said that rains following irrigation will delay operations and often cause excess plant growth. Late season weeds and grass, if not kept under control, are apt to lower the quality of machine-picked cotton. Getting equipment through the field is another problem he said.

It may be possible to integrate "lay-by" herbicides, and perhaps flame, with a system of skip-row management to solve the problems, he said. This would make it unnecessary for a tractor to travel through the normally spaced rows. Instead, it would move on dry alleys or machinery ways between several blocks of rows.

Others at the meetings who spoke on the weed problem included Dr. W. C. Shaw, U.S. Department of Agriculture agronomist of Beltsville, who said that almost 450 million dollars a year are coming out of the pockets of the nation's cotton farmers for weed control. Dr. Shaw said that a well-balanced research program is needed if there is to be continued progress in weed control.

Dr. Shaw stated the immediate problems faced in our current weed control programs include the need for an effective soil fumigant to be used as a pre-planting treatment, a residual pre-emergence herbicide not affected by environment or soil factors, a post-emergence herbicide that enters the weed through the leaves, and more simple herbicide application equipment.

Dr. Grady B. Crowe, agricultural economist at the Delta Branch Experiment Station, Stoneville, Miss., told the conference that the real value of new weed control practices lies in the reduction and better distribution of hand labor requirements to keep costs at a minimum.

Warning producers not to overlook the insurance value and lessened labor requirements of the more complicated control programs, Dr. Crowe stated that the failure to use any kind of advanced weed control measures in seasons of heavy weed infestations can lead to the partial or complete loss of the crop to uncontrolled weeds.

The conference also heard a soil scientist who said that cotton growers should pay more attention to the amount and placement of fertilizers they use. George E. Smith of the University of Missouri soil department, pointed out that except for the cost of the fertilizer, it costs little more to bring a two-bale crop to time of harvest that it does for one which produces only 300 pounds of lint.

Louisiana State University was host to the meeting which was sponsored by the National Cotton Council of America. R. Flake Shaw, executive vice president of the North Carolina Farm Bureau Federation, Greensboro, N. C., was general chairman.

Merck Drops Gibrel Price

Merck & Co., Inc., Rahway, N. J., has announced a price decline in Gibrel and Gibrel formulations from \$10 per gram to a new basis of \$4 per gram.

The company reports that results from its 33 grants-in-aid at agricultural experiment stations throughout the country are indicating definite areas for use for gibberellic acid products, such as in seed treatment. Also, the use of the gibberellins in foliar sprays for agricultural crops appears extremely promising, according to Merck. The price decline makes Gibrel more economically available for use on general agricultural crops.

Conn. Station Names Four

Carl C. Levy, George A. Barber, Carl D. Clayberg, and Raymond J. Lukens were appointed to the staff of the Connecticut Agricultural Experiment Station, New Haven, last month.

Dr. Clayburg is engaged in vegetable research in the department of genetics and Dr. Lukens is conducting research on fungicides. Dr. Levy and Dr. Barber are conducting research in the department of biochemistry.

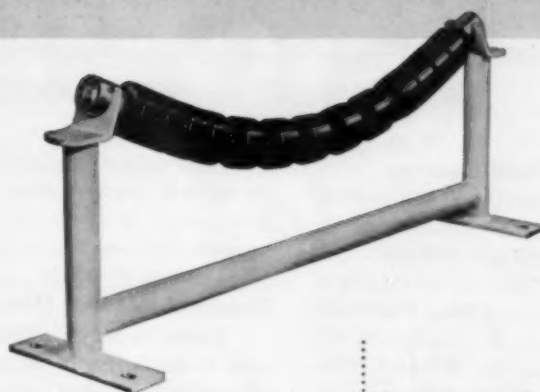
Cattle Grub Committees

The National Cattle Grub Committee has announced the completion of four committees to "take a new look" at livestock grub control programs. The National Cattle Grub Committee was organized at a recent cattle grub workshop held in Kansas City under the sponsorship of Livestock Conservation, Inc.

The four committees are: Research and Evaluation, headed by Dr. E. F. Knipling, director of the USDA Agricultural Research Service; Economics of Grub Control, headed by Roy Lilley, assistant secretary, American National Cattlemen's Assn.; Education and Information, led by Dr. C. E. Bell, chief of the animal industry branch, Federal Extension Service, USDA; and the Program and Procedure committee headed by Herman Aaberg, assistant commodity director, American Farm Bureau Federation.

We've been asked...

"WHAT IS THE JOY LIMBEROLLER BELT CONVEYOR IDLER?"

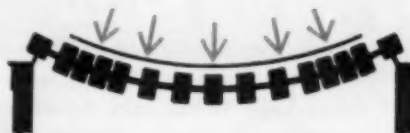


JOY LIMBEROLLER BELT CONVEYOR IDLER

CONVENTIONAL IDLER



Radically different from all other idlers, the Limberoller is a flexible steel cable suspended between two bearings... to which neoprene discs are molded... forming a single roll idler which turns on its own axis. This imparts a flexing action which is self-cleaning... prevents material buildup, a source of trouble with conventional idlers.



Supports the belt throughout its entire width... doesn't have the unsupported gaps left between the rolls like conventional idlers. Increases belt life 20% and more. Materials don't "bump along" from idler to idler, either.



Two bearings, instead of six. They are up out of the dirt zone, not hiding down under the belt. Joy has never replaced a single bearing due to normal failure. Heard enough? There's more... get the whole story from Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

JOY

...EQUIPMENT FOR ALL INDUSTRY

W5W L6931-160A Write for free bulletin 160A-3A

CONVEYORS • AIR AND GAS COMPRESSORS • FANS • BLOWERS • ROCK DRILLS • BLAST HOLE DRILLS
HOISTS • ELECTRIC PLUGS, RECEPTACLES AND POWER DISTRIBUTION SYSTEMS

Sales Campaign For Mixed Fertilizers

The Nitrogen Division of the Allied Chemical & Dye Corp., New York, is conducting an outdoor advertising campaign to help manufacturers sell mixed fertilizers to farmers. The posters started appearing last month.



S. C. Plant Food Meeting

An address by Dr. George King, director, Georgia Agricultural Experiment Station, Athens, Ga., climaxed the eighth annual meeting of the South Carolina Plant Food Educational Society at Clemson, S. C., September 25. He discussed "The South's Changing Agriculture."

Other speakers and their subjects were: Hugh A. Woodle, leader, Clemson Extension Agronomy Work, The Corn Contest; Robert H. Garrison, head, Clemson Seed Certification Department, Small Grain Plantings; J. T. McAlister, conservation equipment engineer, SCS, Orangeburg, Stubble Mulch Planting; Dr. W. H. Garman; National Plant Food Institute, Washington, Expanded Fertilizer Use Program of the National Plant Food Institute; and Dr. J. P. Reed, Southern manager, American Potash Institute, Atlanta, Ga., Importance of Fertilizer Placement.

As indications of a changing agriculture in the Southeast, Dr. King called attention to the development of a new concept of the scope and importance of agriculture, to the fact that small inefficient farms are becoming a thing of the past, to the change from crops alone to crops and livestock on the farms of the area, and to the use of better production practices.

Carbide Garden Chemicals

The National Carbon Division of Union Carbide Corp., New York, will market a new line of dusts, sprays, and weed killers under its long-advertised "Eveready" name.

The appearance of these products next spring will mark Union Carbide's entry into the field of chemical products for home and garden use.

Diamond Midwest Manager

Frank W. Miller has been named sales manager for the Midwest District for Diamond Black Leaf Products, a unit of the Diamond Alkali Co., Cleveland.

Mr. Miller will direct the sale of Diamond Black Leaf agricultural insecticides and herbicides in a 16-state Midwest area. He will make his headquarters in Des Moines, Iowa.

Prior to joining the Black Leaf staff, Mr. Miller was Sales Manager for the Staley Milling Company, Kansas City, Missouri. He joined the company as a salesman in 1947.

Nitrogen Division Names 2

Two men have been named supervisors in the sales department of Nitrogen Division, Allied Chemical & Dye Corp., New York. They are J. T. Stevens, who becomes district sales supervisor for the South Point, Ohio, district, and R. A. Lemler, who becomes Midwest product supervisor for direct application solutions.

Mr. Stevens has been with Nitrogen Division since 1953 and has been concerned with the sale of direct application and mixing materials. His headquarters are at Nitrogen Division's sales office in South Point, Ohio.

Mr. Lemler, who joined Nitrogen Division in 1955 as a field sales representative, is located at Nitrogen Division's sales office in Indianapolis.

Hackett Joins Kolker

John Hackett, formerly North Jersey sales representative for the Monsanto Chemical Co., has been named assistant sales manager of Kolker Chemical Corp., Newark, N. J. In his new post, Mr. Hackett will help handle sales of Kolker's chlorinated solvents, methylene chloride, chloroform, methyl chloride, phosphate esters, tricresyl phosphate and the complete line of the company's plasticizers.

Finney Joins PC&C Co.

Edward E. Finney has joined the Pittsburgh Coke & Chemical Co., Pittsburgh, Pa., as a sales representative in the firm's Industrial Chemicals Division.

Mr. Finney will handle sales of the company's industrial chemicals in eastern New Jersey, Brooklyn and Long Island, N. Y. He had formerly been associated with Goodyear Tire & Rubber Co., and Naugatuck Chemical Co. (Conn.).

Texaco Establishes Fellowship

The Texas Company has established a \$2,500 Texaco Fellowship in Agronomy at the department of agronomy, Iowa State College, Ames, Iowa.

Purpose of the fellowship is to encourage graduate study in the field of agronomy. Such study under the fellowship will be directed primarily toward fundamental research related to the use of nitrogen fertilizer in crop production.

First recipient of the fellowship at Iowa State is John T. Moraghan a graduate student in soil fertility, whose research work is being directed by Dr. John Pesek, Jr., and Dr. Lloyd Frederick.

CSC Opens Atlanta Office

The Commercial Solvents Corp., New York, has opened a new corporate district office with headquarters at 344 Williams St. N. W., Atlanta, Georgia.

T. Austin Young has been appointed district manager of the new office which will serve Alabama, Florida, Georgia, South Carolina, and North Carolina.

AGRICULTURAL CHEMICALS

AP&CC Opens Columbus Office

The American Potash & Chemical Corp., Los Angeles, has opened a new district office at Columbus, Ohio, covering outlets in Ohio, eastern Indiana, southern Michigan and Kentucky.

Chester A. Lawton, who has been with AP&CC since 1950 as district representative in the midwestern area, has been appointed manager of the new district office.

Cox Resigns V-C Post

Edwin Cox has resigned as vice president of the Virginia-Carolina chemical Corp., Richmond, Va., because of ill health. He had been with the company since 1920.

Mr. Cox will remain a consultant to V-C and plans to work at his home as a chemist and chemical engineer. He joined V-C as a chemist in the fertilizer analytical laboratory and rose to chief research man for the Tobacco By-Products and Chemical Corp., a V-C subsidiary, by 1927. He was named a vice president of V-C in 1949.

Mr. Cox is the second V-C vice president to resign recently. Alfred J. Dickinson resigned to accept an executive post with the Freeport Sulphur Company.

B. & A. Cuts Fertilizer Rate

The Bangor and Aroostook Railroad has made a 50 per cent cut in the fertilizer and fertilizer material freight rate from the Boston area to Aroostook County, Maine. The new rate applies to a minimum carload of 80,000 pounds with a lesser reduction on 60,000 pound carloads.

The move is an attempt to regain part of the fertilizer traffic that the railroads have lost to non-common carrier trucks. The rate reduction will mean a saving of \$5.50 per ton of fertilizer shipped by rail from Boston to Van Buren, Me.

To Enlarge Richmond Plant

The Stauffer Chemical Co., will enlarge its Richmond, California, plant to produce 50,000 tons annually of pelletized single superphosphate.

The new plant is expected to be in production about March 15, 1958. To cost about \$350,000, the plant will supply single superphosphate in a uniform, pelleted, dust-free form.

Wilson & Geo. Meyer & Co., exclusive sales agents for Stauffer Chemical Company's three superphosphate plants on the Pacific Coast, will handle the sale of this new product.

Cyanamid Regional Offices

The American Cyanamid Co., New York, has established regional offices in Chicago, Dallas, Los Angeles, and New York for the sales management of all farm and home division products.

Named as managers of the regional offices were John H. Howard, Midwestern region; Ira O. Sturkie, Southern region; Hamilton E. Clark, Western region; and Clyde R. Kennedy, Eastern region.

The field offices are designed to provide more completely integrated service and personalized attention to the requirements of the division's customers.

FOR A Superior AGRICULTURAL LIMESTONE PRODUCT



BRADLEY HERCULES MILLS

From rough to finish . . .
in one low-cost operation

Constant progress in design and manufacture over the past 50 years has made Bradley Hercules Mills the standard pulverizer where a superior agricultural limestone product is desired. Automatic electrical feed control eliminates manual operation. Rugged, dustless construction, maximum accessibility keep maintenance costs at an absolute minimum. In sizes to meet the requirements of most any plant at moderate cost.

For complete information, write for Catalog No. 61



Bradley PULVERIZER CO.

LONDON ALLENTOWN, PENNA. BOSTON



grow quality
with **POTASH!**

You name the row crop—and you'll find that it grows better, produces more, brings higher prices, when it is supplied with plenty of *available* Potash.

Nature can go only so far in providing vitally needed Potash. Fast-growing, high-producing crops can easily exhaust the available soil supply—and then it's up to you. That's why it's good business to be sure your fertilizer program includes plenty of **POTASH**—either in your mixed fertilizers or as a supplemental application.

American Potash & Chemical Corporation is a basic supplier of Potash. Consult your fertilizer dealer today and be sure to specify plenty of TRONA® POTASH, the vitally needed plant food.

American Potash & Chemical Corporation



Producers of: BORAX • POTASH • SODA ASH • SALT CAKE • LITHIUM • BROMINE • CHLORATES • PERCHLORATES • MANGANESE DIOXIDE • and a diversified line of specialized agricultural and refrigerant chemicals.

Offices • 3030 WEST SIXTH STREET, LOS ANGELES 54, CALIFORNIA
99 PARK AVENUE, NEW YORK 16, NEW YORK
235 MONTGOMERY STREET, SAN FRANCISCO 4, CALIFORNIA
1320 S.W. BROADWAY, PORTLAND 1, OREGON
214 WALTON BUILDING, ATLANTA 3, GEORGIA

AGRICULTURAL CHEMICALS

O.K. Toxaphene On Cattle

Beef cattle producers have approval to use toxaphene for control of cattle lice, according to a recent U. S. Department of Agriculture announcement. Lice infestation usually builds up with the coming cold weather, so the USDA announcement enables beef producers to plan the use of toxaphene when lice control is most needed.

Toxaphene may be used on all beef animals, and for non-milking cows and bulls in dairy herds. The recommended mixture is 3 quarts of 6 pound per gallon emulsifiable toxaphene or 10 pounds of 40 percent wettable powder to 100 gallons of water.

Rotenone is another safe and effective insecticide for lice control, on beef or dairy cattle. The recommended rotenone mixture is 1¼ pounds of 4 per cent rotenone powder to 100 gallons of water.

The USDA approved toxaphene for beef cattle after the Food and Drug Administration established a tolerance of 7 parts per million of toxaphene in the fat of beef cattle, sheep and goats. Treatment must be discontinued 4 weeks or more before slaughter.

Toxaphene is not recommended for swine or milking dairy cows, because the FDA has not set tolerances for these uses.

R&H Obtains Injunction

An order has been entered by the Federal District Court of West Virginia enjoining Roberts Chemicals Inc. from continued infringement of the patent under which the Rohm & Haas Co., Philadelphia, sells its Dithane brand fungicide. The order enjoins Roberts from making, using or selling any fungicide composition having as an active ingredient nabam, or any other salt of an alkylene bisdithiocarbamic acid.

A year ago, the Rohm & Haas patent was held to be invalid by the District Court but in June of this year an appeal from this decision was decided in favor of Rohm & Haas and their Dithane patent was upheld by the United States Court of Appeals for the Fourth District.

NOVEMBER, 1957



A. J. Dickinson

Dickinson Joins Freeport

Alfred J. Dickinson has joined the Freeport Sulphur Co., New York, as vice president and sales manager succeeding the late Roy B. Johns.

Mr. Dickinson, until he accepted the position with Freeport, was vice president of the Virginia-Carolina Chemical Corp., Richmond, Va.

Sevin Tests Show Promise

Tests with Sevin experimental insecticide show high promise for control of a wide range of cotton insects, according to the Union Carbide Chemicals Co., Division of Union Carbide Corp., New York, manufacturer of the new product.

The insecticide's composition differs from the phosphates, chlorinated hydrocarbons, arsenicals, and fluorides. Toxicology work in progress indicates Sevin will rank as one of the safer insecticides. Sevin experimental insecticide is an aryl urethane, and its chemical name is 1-naphthyl N-methylcarbamate. Carbide expects to market the product after collection of toxicity and crop residue data and compliance with governmental pesticide regulations are completed.

Name Rydell Vice-President

R. S. Rydell has been elected to serve as vice-president for chemical products of the Smith-Douglass Co., Inc., Norfolk, Va.

Mr. Rydell had been president of the Coronet Phosphate division of Smith-Douglass since he joined the company in 1954.

C.F.A. Meeting Nov. 3, 4, 5

Under Secretary of Agriculture True D. Morse and Dr. Russell Coleman, executive vice president of the National Plant Food Institute, will be the featured speakers at the 34th annual convention of the California Fertilizer Association.

This year's program will be held on Nov. 3, 4 and 5 at the St. Francis Hotel, San Francisco. The addresses to be given on Monday the fourth will touch upon different facets of the convention theme, "Our Partnership With Agriculture." A panel discussion on that subject will be the feature of the Monday afternoon program.

Moderated by Dr. D. G. Aldrich Jr., chairman, Department of Soils and Plant Nutrition, University of California, Davis and Berkeley, the panel will consist of Dr. George B. Alcorn, Director of Agricultural Extension, University of California, Berkeley, representing official agriculture in the State; J. Earl Coke, Vice President, Bank of America, San Francisco, who will speak for crop production financing agencies; John Martin Jr., well known Salinas grower and shipper, and a past director of Western Growers Association, on agricultural marketing problems; and Lowell W. Berry, President, The Best Fertilizers Co., and a director of the association, of Oakland, representing the fertilizer industry.

Yellow Cuprocide Withdrawn

The Agricultural and Sanitary Chemicals department of Rohm & Haas Co., Philadelphia, has withdrawn from the market its copper-based fungicide, yellow cuprocide.

According to Carlos Kampmeier, head of the department, yellow cuprocide has been supplanted in recent years in agricultural sprays and dusts by organic fungicides. "Dithane D-14, Z-78, and M-22 have demonstrated their superiority over copper-based materials in nearly all applications," Mr. Kampmeier said. "Consequently we are concentrating our production facilities and grower-cooperation on these organic fungicides and are discontinuing the sale of yellow cuprocide."

*Announcing
a New Agricultural
Pesticide*

DELNAV*
(Formerly Hercules 528)

*Trademark



After three years of extensive field tests, Delnav—a new phosphate pesticide—will be commercially available in limited quantities this year.

With indicated effectiveness in controlling a wide range of crop pests, this unusually long-lasting pesticide has already been recommended by various state authorities for use on cotton. Test results have also demonstrated the usefulness of Delnav on citrus and deciduous fruits, grapes, vegetables, and ornamentals as well as control of cattle ticks.

Developed at Hercules' Research Center and Agricultural Chemicals Laboratories, Delnav has been evaluated by Hercules, the United States Department of Agriculture, and various state agricultural research laboratories. Among the insects it controls are leafhoppers, thrips, leaf miners, and mites of various types. The effectiveness of Delnav is shown by the fact that it not only destroys adults but also the eggs of mites.

Delnav will be available in dusts or sprays in the near future. Additional information on this new product can be obtained by writing to Hercules.

HERCULES

*Agricultural Chemicals Division
Naval Stores Department*

HERCULES POWDER COMPANY

INCORPORATED
900 Market Street, Wilmington 99, Del.

HH57-1R

AGRICULTURAL CHEMICALS

Clawson Joins Texas Co.

Willard A. Clawson has been appointed petrochemical sales representative in Ohio and Michigan for the Texas Co., New York. Texaco is currently completing an anhydrous ammonia plant at its Lockport, Illinois refinery, which will produce anhydrous ammonia and nitrogen solutions for agricultural use.

Mr. Clawson was formerly a vocational agricultural teacher in Kentucky and was later employed by the Nitrogen Division, Allied Chemical and Dye Corporation.

CFA Grant To U. of Cal.

The California Fertilizer Association reports that arrangements have been concluded to assure an intensive three year fertilizer research program by the University of California on the several varieties of beans produced in various areas of the State. Research will go forward on the use of foliar analysis for diagnosing the nutrient status of the several varieties of beans under varying soil, water and climatic conditions.

The comprehensive program will be undertaken by the University Department of Soils and Plant Nutrition, under the direct supervision of Dr. Albert Ulrich, Plant Physiologist in the Experiment Station. The Association's Soil Improvement Committee is providing \$9,000 from its grant-in-aid funds over the three year period in order to finance this program. These funds will support the activities of a Research Assistant to Dr. Ulrich.

Cal. Ammonia Breaks Ground

Earl Coke, vice president of the Bank of America, turns the first spadeful of dirt for the California Ammonia Co.'s five million dollar plant in Lathrop, Calif. Looking on are: (left to right) Lowell W. Berry, chairman of the California Ammonia Co.; Sheriff Carlos of San Joaquin County; Mr. Coke; Bernell Harlan, president of the California Ammonia Co.; and E. Van Dornick, vice president of the Macco Corp., Los Angeles. The plant is expected to be completed by October, 1958.



Two New Firms Formed

Jomac Inc., Philadelphia, Pa., and James North & Sons Ltd., London, England, have established two new companies to manufacture and sell each others products in the United States and in principal industrial areas throughout the world.

Jomac manufactures terry cloth work gloves. James North & Sons manufactures work gloves and protective clothing.

In the United States, the two companies have formed Jomac-North, Inc. to manufacture the complete North PVC (polyvinyl chloride) line of coated gloves, protective clothing and aprons. Equipment for manufacturing both the coated fabric and the finished products is being installed in Jomac's plants in Philadelphia and Warsaw, Ind.

Stauffer Trithion Plant

Trithion, the organic phosphate pesticide developed by Stauffer Chemical Co., New York, will move into large-scale production prior to the next crop season, according to a recent announcement made by the company. Plans have been completed for the construction of a trithion plant at Henderson, Nevada, which is expected to be in operation by February.

The unique pesticide was developed by Stauffer's Research Laboratories at Richmond and Mountain View, California, four years ago. Since that time, it has moved through two successively larger pilot plants and, during the past season, has been made in a large semi-works plant at Richmond.

V-C Earnings Called Poor

William H. Wilson, president of the Virginia-Carolina Chemical Corp., Richmond, Va., told his first meeting of V-C stockholders recently that the company "has a long history of mediocrity."

Some of his remarks at the meeting seemed to contrast with his statement in the firm's annual report that the year's results were encouraging. "It is true," he said, "that there were an unusual amount of special charges applied to the income for this period, but in the final analysis the results must be measured on the basis of the bottom line figure."

Mr. Wilson said it probably will take 36 months to put the firm on "a permanently sound basis." He said a rebuilding plan is definitely under way. Mr. Wilson noted some unprofitable operations have been eliminated and said he was optimistic about the future.

Lebanon Names Tomlinson

Kendall S. Tomlinson has been appointed sales manager for farm fertilizers by the Lebanon Chemical Corp., Lebanon, Pa.

For the past three years, Mr. Tomlinson had been northeast area sales manager of the Nitrogen Division of the Allied Chemical & Dye Corp., New York.

Heads New D-O Division

John Lucas has been named director of the newly-formed Plant Engineering Division of Dorr-Oliver Inc., Stamford, Conn. Components of the company's former process and plant design groups have been consolidated to form the new division.

FTC Hits False Azomite Ads

The Federal Trade Commission has ordered Azome Utah Mining Co., Inc., Sterling, Utah, to stop misrepresenting the benefits of "Azomite" as a feeding supplement for poultry or as a soil conditioner.

The Commission pointed out that Azomite—to the extent it is used in the feeding of poultry—is a food and a drug and that Section 12 of

RAYMOND MILLS

...the Formula
for economical
INSECTICIDE
PULVERIZING

ROLLER MILLS

and

IMP MILLS

with

Whizzer Separation

PRODUCTION

Raymond whizzer-equipped Mills deliver uniformly fine, intimately blended, free-flowing insecticide powders of superior grade.

The Roller Mill is today's standard equipment for handling organic concentrate formulations as well as sulphur-bearing and other field strength products.

The Imp Mill is a smaller capacity unit of the impact type for producing field strength dusts directly from the technical material with little or no grinding of the diluents.

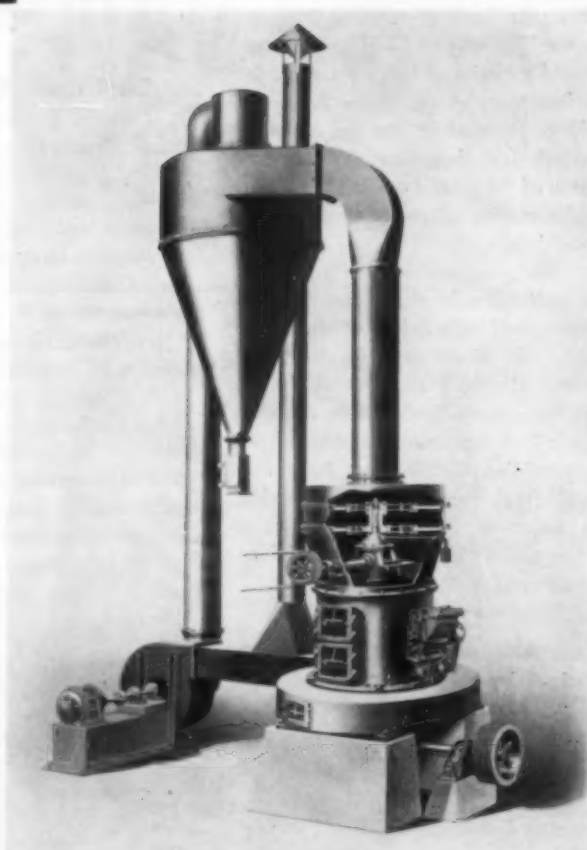
OPERATION

The material is handled automatically from feed hopper to finish bin by clean, dust-free operation. Whizzer separation is an exclusive feature that provides wide range classification with easy fineness control, and consistent uniformity of product.

INSTALLATION

Raymond Mills are compact units that save floor space. The piping and collectors may be arranged to fit your existing plant layout with few if any alterations. The principle of separating and conveying the material by air-flow results in fewer moving parts and lower cost maintenance.

If you have a special insecticide grinding problem, there is a size and type of Raymond Mill to meet your needs. Tell us your requirements.



Raymond Roller Mill with Whizzer Separator. For the Imp Mill and other data, see Bulletin #84.

COMBUSTION ENGINEERING, INC.

1314 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

Raymond Division

SALES OFFICES IN
PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

the FTC Act specifically outlaws the dissemination of any false advertisement, through the mails or by any means in commerce, which is likely to induce the sale of a food or a drug. A previous decision by an FTC examiner had ordered Azomite to cease and desist but was vacated in favor of the latest ruling because the initial decision was regarded as limited in scope.

Contrary to advertising claims, the Commission said, Azomite, when used as a poultry feeding supplement, will not stimulate appetite, lower production costs, or increase profits and egg production.

Eli Lilly Grant To K-State

The search for antiviral compounds which might help control such diseases as wheat streak mosaic, barley stripe mosaic, tobacco mosaic, and cucumber mosaic, will be continued in the Kansas agricultural experiment station this year with the assistance of a \$1,500 per year grant-in-aid from the Lilly Research laboratories of Eli Lilly and Co., Indianapolis, Ind.

The Kansas State College scientists, led by Webster H. Sill Jr., are seeking a biochemical which might serve as a viroside, functioning against viruses in much the same way that antibiotics do against bacteria.

Two of the compounds already screened by Mr. Still and Ren Chong Chiu have exhibited some antiviral potential against the broad leaf viruses, but nothing yet has been found which might work with any of the grass viruses. If in further screening the K-State researchers find others with antiviral possibilities, more serious studies will be undertaken with these and related compounds.

Fulton Sells Denver Branch

The Fulton Bag & Cotton Mills, New Orleans, has sold its textile bag manufacturing branch in Denver, Colo., to the Fulton-Denver Co.

Mr. W. M. Ritchie has been named to represent Fulton in Denver specializing in the sale of multi-wall bags and other Fulton products throughout the Rocky Mountain Area.

Dow Transfers Two

Dow Chemical Co., Midland, Mich., has transferred John H. Davidson from the field research group at South Haven,



J. H. Davidson Dr. H. E. Gray

Mich., to handle special projects for the company's Agricultural Chemical Development staff at Midland.

Dr. Henry E. Gray, who has been working out of the Washington, D. C., office also has been transferred to Midland as a project leader for insecticides and commodity, space, grain, and spot fumigants.

For the past three years, Mr. Davidson has been dividing his time between field research plot work and ACD work involving cooperative tests with experiment stations in the Lake States area. Dr. Gray's activities in the east were concerned with fumigants, fungicides, and insecticides.

Scott Joins Pennsalt

Dr. Francis L. Scott has been appointed project leader in the Technical Division of the Pennsalt Chemicals Corp., Philadelphia. He will conduct basic research in organic nitrogen chemistry to try to develop new and useful products from one of Pennsalt's basic chemicals, ammonia.

Dr. Scott is an authority in the field of nitrogen and sulfur chemistry and is the author of more than 40 publications on the subject.

Shell Workshop At St. Louis

The Shell Chemical Corp., New York, conducted another in its series of nematology workshops on Oct. 9 and 10 at the Hotel Kingsway in St. Louis.

Dr. V. G. Perry, U.S. Department of Agriculture nematologist at the University of Wisconsin, headed the list of speakers who discussed nematode control before a group of farmers and growers from the St. Louis area. A panel presentation discussed plant parasitic nematodes and State-Federal nematode control projects. Dr. E. F. Feichtmeir, manager of the product application depart-

ment, Agricultural Research Division, Shell Development Co., Denver, told of soil fumigation application equipment and Dr. Perry reviewed the economics of fumigation.

No Moths Found In Jersey

No gypsy moths have been found in the 190,000-acre section of North Jersey sprayed by aircraft last spring in an attempt to eradicate the pest from that state.

According to Frank A. Soraci, director, Division of Plant Industry, New Jersey Department of Agriculture, the spray operation was completely successful.

Trapping has now been completed and no moths were recovered from the area treated with insecticide. This summer 4,500 traps were placed in a grid pattern throughout two million acres of land in the northern half of the state. The total catch amounted to only three gypsy moths. Two were found in Morris County and one in Hunterdon County, spots well outside the spraying area.

"With such excellent results from this year's spray program," Mr. Soraci said, "there will be no need for extensive air plane application of insecticide to combat the gypsy moth in New Jersey in 1958."

Calspray Names Hawks

The California Spray-Chemical Corp., Richmond, Calif., has appointed Dr. George R. Hawks as a district agronomist at the company's Lindsay, Calif., branch office.

Dr. Hawks' appointment brings the total of Calspray's field staff of agronomists to seven. Prior to joining Calspray, Dr. Hawks was a soil scientist with the U. S. Department of Agriculture, working largely on fundamental phosphate nutrition at Beltsville, Md.

Hooker Dividend

The Hooker Electrochemical Co., Niagara Falls, N. Y., has declared a quarterly dividend of \$1.0625 per share on the company's \$4.25 cumulative preferred stock, payable Dec. 27, 1957 to stockholders of record Dec. 3.

Fertilizers won't cake—flow freely in the field

Many a farmer has been cursed by the serious caking problem which so often occurs when deliquescent fertilizers are stored in damp or humid conditions. And many a formulator has learned that this can easily be prevented by using Celite*. These tiny particles of diatomite surround the fertilizer crystals or prills with

a protective coating that can prevent contact between them and thus minimize caking.

At the same time Celite fillers improve flowability. The particles are not only microscopic in size but extremely irregular in shape. Thus Celite coated fertilizers flow more freely. As little as 2% of Celite assures more uniform

application in the field.

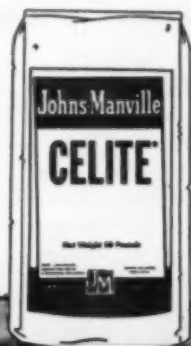
A Celite engineer will gladly help you put the right grade to work in your fertilizer. Just phone him at your nearest Johns-Manville sales office or write Johns-Manville, Box 14, New York 16, New York. In Canada, address 565 Lakeshore Road East, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

when formulated with

CELITE

diatomite fillers



Johns-Manville CELITE

INDUSTRY'S MOST VERSATILE
MINERAL FILLER

AGRICULTURAL CHEMICALS

Nematode Control, Industry Quarantine Programs, Among Discussions Featured at WACA Meeting

by Charles Starker

WESTERN representatives of manufacturers of Agricultural Chemicals met October 7 and 8th at the Vila Hotel, in San Mateo, California, for the 28th annual meeting of the Western Agricultural Chemicals Association. The business meeting was chaired by president A. F. Kirkpatrick, American Cyanamid, Oakland. Reports were heard from key members of the legislative committee regarding the status of legislation in which the industry has an active interest. This report embraced all areas in which WACA members do business. Reports were also heard from chairmen of the technical and legal committees. C. O. Barnard, executive-secretary gave members a financial report. Ballots were then passed out and the following elected to the organization's board of directors: Northern District — R. S. Braucher, Dow Chemical Company, Seattle; Central District — Ivor R. Burden, United Heckathorn, Richmond; Paul F. Drescher, American Chemical Paint Company, San Jose; A. F. Kirkpatrick; American Cyanamid, Oakland; Edward Schuler, Monsanto Chemical Company, San Francisco; and Stanley W. Strew, Colloidal Products Corp., Sausalito; Southern District — Jack White, White Chemical Company, Phoenix, Arizona and Stanley W. Woogerd, Oasis Chemical Company, Imperial, California.

The newly elected directors met with the "hold-over" directors and elected Ivor Burden of United Heckathorn as president; Tom Castle, A. I. Castle Company, Mountain View, California, vice-president and re-elected C. O. Barnard as executive secretary.

What Motivates Growers to Buy Pesticides?

Members were treated to a most interesting presentation of this subject by Drs. J. M. Bohlen and G. M. Beal of the Department of Econom-

ics and Sociology, Iowa State College. Their flannel-board "show" and "two-man act" kept their audience at full attention for the entire three hours of their presentation. The speakers graphically showed how new ideas in farming are accepted by the individual; where people first learn of these ideas; how they react to them; how they evaluate them; and finally how they decide to try them out. Speed of adoption of a totally new idea may take as long as 14 years, as was the case with hybrid seed corn. However, once the idea of hybrid corn came to be established, growers clamored for release of new types as soon as they were announced. It was most interesting to note that a common curve of adoption for practically every new development in farming practice can be drawn on the basis of the careful sampling done by this team and their co-workers.

(A full report on this presentation, which was also made at the recent NACA meeting, appeared in the October issue of *Agricultural Chemicals*.)

Nematodes

"Recent developments in the use of soil fumigants have increased their use considerably," stated Dr. M. W. Allen, University of California, Berkeley. These uses include the established method of pre-plant treatment; a minor modification of this, where "row placement treatment" is made—with the soil zone to be occupied by plant roots only being treated; and the relatively new "row placement" application technique. Pre-planting and row-placement applications do not have quite the critical requirements for the fumigant, as is the case where post-planting, side-dress application is made; here care must be paid to the phytotoxic side-effects which may come from the fumigant used.

Root-knot nematodes—the majority of the soil population is usually

second-stage, free-living larvae, and these are quite susceptible to all present-day nematocides. If permitted, larvae will penetrate completely into the root, and then later deposit their gelatinous egg mass. Infested crop residues from previous crops frequently infect susceptible crops following the rotation.

Cyst formers are unique in that the eggs are retained within the body of the female. Upon the death of the female, her body forms a tough, protective coating over the eggs. The action of the nematocide must be directed at the cysts; if but one cyst escapes, there can still be a fairly high nematode population, sufficient for infestation. This type pest is usually found in large numbers in the soil, when present. Most nematocides apparently do not affect cysts within the top 2-3 inches of soil.

Soil environment is most important. Soil should be in "seed-bed" condition, in good tilth, and with no crop residues before treatment is attempted. Adequate soil moisture is essential—sandy soil should be treated when at, or near field capacity (12% or less). On most soils, best time to treat is when soil is within 20-30% of field capacity. Soil texture is probably the most important single factor in use of nematocides; as the percentage of clay increases, the dispersion of the nematocide is more limited, and control goes down. Moisture-hiding capacity of soil is also correlated with clay content.

While soil temperatures of 85°F. have been found to be best under laboratory conditions, many field applications have been made in the range of 40-70°F., with apparently great success.

Dry soils should not be treated, unless a water application of water-soluble nematocide is used. If these suggestions are not followed, the dry soil plus adsorptive capacity of soil particles causes a high vapor pressure, the fumigant moves out too rapidly, and a sub-lethal concentration of fumigant results.

Post-treatment care includes use of a drag or roller after a chisel injection; with water applications, the

area should be left undisturbed for a reasonable period of time.

In summary, Dr. Allen stated "Soil tilth, lack of crop residues, and adequate soil moisture are the most important factors in soil fumigation."

Plant Industry Problems

"The speed of modern transportation has increased the rapidity with which new pests may be introduced," Allen B. Lemmon, Chief, Bureau of Plant Industry, California State Department of Agriculture, told the group. Pest detection is one of several functions of this Bureau.

In spite of all quarantine precautions, some pests always manage to get through. Then eradication must be attempted, or growers have to learn to "live" with the pest. One invasion of the Mexican bean beetle was halted, and the pest wiped out wherever found in the state. The full scale eradication program has proceeded to the point where it is believed this season will terminate the extensive HCN fumigation program begun more than 10 years ago. The Khapra beetle was first found in the Western Hemisphere in Tulare County in 1953. A state-wide control program, using methyl bromide fumigation, and featuring extensive tarping of entire warehouse exteriors, was necessary to bring this menace under control. In California a total of about 85 million cubic feet of warehouse space has been fumigated. Currently, more than 3,000 warehouses have been so treated, some of which had a capacity as high as 4 million cubic feet. Warehouse premises were also treated with a spray of oil and malathion. Khapra beetle is also found in Arizona, New Mexico and lower California, where control measures are also going forward.

"With annual farm cash receipts of some two and a half billion dollars, is it any wonder the producer wants to be protected? Certainly, the more he is protected, the more opportunity there is for the agricultural chemical industry to share in the total "Agri-Business," Mr. Lemmon concluded.

Almost nine million dollars are spent for weed control in California, stated W. A. Harvey, University of California, Davis. Nine hundred producers of agricultural chemicals have over 12,000 pesticides registered in the state; 1200 pest control operators and some 1200 agricultural pilots are also registered.

Estimated annual weed losses in California on dry land are 10 million dollars; on irrigated lands, 163 millions; and the annual water losses

due to weeds in existing water systems and lakes is 400,000 acre feet of water,—enough to produce 40 million dollars' worth of crops. The ultimate loss could be 1 million acre feet of water per year. Irrigation districts are spending \$100 or more per mile for weed control on ditches.

Weed control costs per acre of cultivated crop in California average roughly as follows: Table grapes, \$30-50; cotton, \$20-40; strawberries, (Continued on Page 107)



DO YOUR PLANE DUSTS HAVE GROUND ROLL?

Airplane dusts made with Barden Clay develop a "ground roll," covering the underside as well as the upperside of the leaf. Barden Clay has bottom-side coverage up to 70% or more of upper leaf surface deposit...and Barden's excellent adhesive qualities hold the toxicant to the leaf for double crop protection! Results prove that for dustability, coverage, retention and mortality, Barden Clay is the outstanding diluent. To quote one leading manufacturer, "Barden Clay is so superior we can't afford not to use it."

For ground or plane dusting, use Barden Clay, the scientifically-prepared diluent. It adds extra power to your product...extra punch to your sales. Samples on request.

J. M. HUBER CORPORATION
100 PARK AVENUE, NEW YORK 17, N. Y.



World's Largest Producer
of Aerfloated Kaolin Clay

For Dust or Spray...
use Barden Clay—
the Low-Cost Scientific Diluent

7-Point Barden Score

✓	Improved dispersion
✓	Lower abrasion
✓	Better coverage
✓	Better retention
✓	Higher mortality
✓	Greater uniformity
✓	Maximum economy

AS WE GO TO PRESS

N. S. C.'s Fertilizer Section Cites Drop In Accident Rate

By H. H. Slawson

SINCE the organization of the National Safety Council's fertilizer section seven years ago, the accident frequency rate in plants operated by members of the section has been reduced by 43 percent while insurance carriers in many cases have reduced their premiums and the cost of accidents in general has been cut in half.

Reviewing accomplishments of the fertilizer section at the annual meeting during the National Safety Congress in Chicago, Oct. 21-22, E. O. Burroughs, Jr., general chairman of the group and manager, insurance dept., F. S. Royster Guano Co., Norfolk, Va., cited these facts as among the most outstanding results from the section's accident prevention program.

He spoke, too, of the psychological results from the annual meetings and conference. Men gather from throughout the nation, he pointed out, to discuss mutual problems of accident prevention and learn how the other fellow does it. Then they return home where they check up on their own safety programs and make any adjustments as seems desirable in the light of what they have learned at these meetings.

At the business session which opened the two-day conference at Chicago's Lasalle Hotel George E. Dietz of Fertilizer Mfg. Cooperative, Inc., Baltimore, Md., was elected general chairman of the fertilizer section, to succeed Mr. Burroughs for the 1957-58 term.

George L. Pelton, Smith Agricultural Chemicals Co., Columbus, O., was advanced from secretary to vice chairman and Elmer C. Perrine, technical representative, nitrogen div., Allied Chemical & Dye Corp., New York, was elected secretary. Twelve men also were chosen to fill vacancies on the 36-member executive committee.

This year's Chicago conference

program included two papers dealing with safe handling of hazardous fertilizer components and three discussions of aspects of administration problems associated with plant safety promotion. Also presented were two talks dealing with the industry's "good old days" and the progress of the safety movement in South America.

"Carelessness can be costly" was the theme of a paper by the section's new secretary, Elmer C. Perrine, of Allied Chemical & Dye Corp., in which he suggested means for reducing the hazards of using acids and nitrogen solutions.

Transition from the simple process of early days to the complexities of modern industry has often been neither simple nor pleasant, Mr. Perrine observed. But, in general, he declared, the transition has been achieved with safety and efficiency. Where hazards have attended the transition, the accusing finger, he added, "may be pointed at management and at those who knew the hazards yet may have failed to carry the message through effective channels. . . . The efforts to reduce the toll of accidents have usually resulted in increased use of a process or product at less risk and often with greater profit."

It is never safe nor accurate, Mr. Perrine went on, to assume that the new granulation process is merely an extension of the making of pulverized fertilizer. He emphasized the need for increased alertness in handling sulfuric and phosphoric acids.

Much more acid and nitrogen, he explained, are generally used in a ton of granulated fertilizer than in pulverized grades. This produces a fertilizer of good quality, but often, in the process, the techniques and equipment "sometimes creep unnoticed from good to hazardous."

He pinpointed danger points in

the mixing of ammonia with superphosphate where closer attention should be given to potential hazards. Performing the operations in continuous operations he described as a "neat trick" and added that "there may be rewards beyond the good ones of safety that will add impetus to work on this problem." Often, he said, the hazards arising from use of acids with nitrogen solutions can be guarded against by "just plain and efficient operations."

Discussing fire hazards, Mr. Perrine noted that not all the factors in fires are yet known, but it is certain that indiscriminate use of ingredients or poor equipment can result in fires or explosions. He could not promise any guarantee of immunity, but he suggested that "the practices and equipment that use the ingredients most effectively are good precautions against fire hazards."

In a paper discussing ammonia hazards, E. V. Anderson, safety engineer, Johnson & Higgins, insurance brokers, New York, complained that people do not appreciate the reasons why ammonia must be handled carefully. When nothing happens, people who work with ammonia get careless, he said, with consequences such as followed in several cases, which he described.

Mr. Anderson complained that for some reason, ammonia cylinders are not equipped with relief valves or vents. "If just one cylinder a day blew up," he remarked dryly, "maybe there would soon be a change in design of these cylinders."

"We must appreciate," he declared, "that a cylinder will blow up some day if it is affected by improper temperature. And you must remember that, if you are not handling ammonia properly, you are not running a safe plant."

Frank A. Gerard, safety manager, Olin Mathieson Chemical Corp., New York, in his talk on "Front Office Safety" contented that cooperation of top management is a "must" for any successful industrial accident prevention program.

"The guy in the front office," he said, "is all for safety. But he cannot help if he is not aware of the problems

out in the shop. The safety director may know that eye injuries are increasing, but, if he doesn't reach the big boss up front, to explain why protective goggles are needed, the boss has a good alibi for inaction." "Your best bet there," he added, "is to sell the boss on the idea that goggles for all the workers will cost less than accidents to their eyes."

"Fear is the enemy of safety," was the declaration of Dr. John H. Fougler, director, medical research, E. I. du Pont de Nemours & Co., Wilmington, Del., in a talk on "Safety—A Retreat or a Challenge."

Last year, Dr. Fougler recalled, a pathologist said in Rome that many chemicals used to process or package foods might cause cancer. This purely speculative statement, he said, was flashed around the world, repeated and magnified with repercussions that are still with us.

Last year, too, he went on, one of the presidential candidates raised the question of damage to health by fallout from A-bomb tests, and speculation, which disregarded the facts, resulted in public uproar and petition signing.

At the same time, he said, no one paid much attention to the fact that 40,000 persons died on U. S. highways and that 28,000 others were killed in their homes in 1956. Apathy to facts and undue preoccupation with speculative fears, as demonstrated by these examples, he said, "form a pattern of schizophrenia in which behavior is completely disassociated from reality. Just as a patient suffering from schizophrenia can do harm to himself and to others, so can a populace harm itself greatly if it ignores facts and bases its performance on speculation."

Applying his ideas to accident prevention, he emphasized that in dealing with accidents "we must not retreat from reality." Action and safety go together, but the action must not be disorderly, he suggested. It must be reasonably planned and that means that it must be based on knowledge. That means further that everyone in the plant must know the why of the protective and preventive measures imposed on the workers. And re-

sponsibility for seeing that this knowledge reaches the workers rests on the shoulders of management, he insisted.

How thorough accident investigation can lead to improvement of an accident prevention program was the theme of the next speaker, James E. Kavanaugh of Travellers Ins. Co., Minneapolis, Minn.

"It would be easy," Mr. Kavanaugh said, "to conclude that 90 percent of the men involved in accidents are stupid. But if we did that, it would make control and prevention of accidents absolutely impossible. If conclusions are to be justified, all the facts regarding a particular accident must be brought out by adequate investigation. Otherwise we may end up with false conclusions that will carry over into the entire safety program with disappointing results."

"Most accidents," he asserted, "occur because somebody did not know enough at the specific time. If we find out why he did not know enough, we're on the way to progress. Be sure, too, that you don't investigate the person involved in an accident. That might be a good way to prevent crime but it won't help in accident prevention. The investigation should deal entirely with the incident. You must try to identify the cause of the accident, then establish controls to prevent a recurrence in the future."

Thomas J. Clarke of Cooperative G.L.F. Exchange, Ithaca, N. Y., was scheduled to address the Tuesday luncheon session of the fertilizer section, but could not keep the engagement. When this was announced, it created a bit of ironic laughter, because Mr. Clarke's subject had been "The Man Who Wasn't There."

Substituting for him, however, was another GLF man, Stratton McCargo, personnel supervisor, who discussed "the good old days" of 50 years ago in the fertilizer industry and contrasted conditions then with changes apparent today.

"We've been transformed," said Mr. McCargo, "from what used to be considered a humble scavenger industry, into an important element of the chemical industry which commands respect everywhere." High

among the advances, he said, is management's interest in accident prevention by elimination of the "booby traps" existing in the old time plants. The changes, he said "are due to the changes in the hearts of men that have made each and all feel that we are indeed our brother's keeper."

The industrial safety movement in South America is about where it was in the United States 45 years ago, when the National Safety Council was organized, said A. B. Pettit in his talk which closed the section's program. Mr. Pettit, who is director of industrial health and safety for W. R. Grace & Co., New York, recently returned from a year spent in introducing an accident prevention program into his company's South American branches. His informative report on conditions as he observed them was accompanied by slides in color reproducing his own artistic feats with a camera.

E. O. Burroughs, Jr., retiring general chairman of the fertilizer section, was presented with a framed plaque expressing the National Safety Council's appreciation of his activities in promoting safety during his term of office.

Vernon S. Gornito, who recently retired from his long service with the Smith Douglas Co., was also presented by the Safety Council with a special plaque which recited his record as an influential leader in the fertilizer safety program, and his relations with the fertilizer section since its creation, including a term as chairman and continuing membership on the executive committee.

To Build Plant At Martinez

The Shell Chemical Corp., New York, will build a new market development unit at Martinez, Calif., for the manufacture of semicommercial quantities of chemical products and thus facilitate the growth of new chemicals from the laboratory stage to commercial production.

The plant will consist of several reactor systems with numerous purification units which can be interconnected in order to utilize most of the known unit processes and operations to produce a wide variety of products.

Leaves Canadian Department



Percy M. Overholt (right), Associate Chief of Pesticides Inspection Services, Canada Department of Agriculture, Ottawa, has retired after 32 years of service. S. C. Barry, director of production services, is shown making a presentation to Mr. Overholt from his colleagues.

Mr. Overholt joined the Seeds Branch of the department as an inspector in 1925. He moved to Ottawa in 1930 as assistant to the seed commissioner and, in 1949, became an administrative officer.

15th Horticulture Congress

The 15th International Horticultural Congress has been scheduled to be held in Nice, France, from April 11 to 18, 1958.

Included in the provisional program are sections on vegetable and seed-stock growing, fruit growing, flower growing, ornamental shrub and tree growing, Mediterranean and subtropical plant growing, modern techniques and productivity in horticulture, and horticultural climatology. Several excursions to regions of special tourist interest have been planned for before, during and after the congress.

Frank McQuade Retires

Frank McQuade, who has been in the chemical field for 42 years, retired last month as assistant to the manager of sales for fertilizer products at the Curtis Bay, Md., plant of the Olin Mathieson Chemical Corp., New York.

Mr. McQuade started his career with the Standard Wholesale Phosphate and Acid Works. He was the chief officer of that firm for three years before its merger in 1950 with Olin Mathieson. Since then he has been supervising the export of fer-

tilizer products from the plant at Curtis Bay.

Iowa Fertilizer Conference

The Iowa State College Fertilizer Short Course Committee has announced that this year the Fertilizer Conference for Manufacturers and the Short Course for dealers will be held on Dec. 3 and 4 respectively at Ames, Iowa.

Copies of the programs for both meetings are expected to be available this month.

Gilbert To Head Westvaco

Frederick A. Gilbert has been named president of the Westvaco Chlor-Alkali division of Food Machinery and Chemical Corp., New York. Mr. Gilbert, who has been president of FMC's Becco Chemical division, will continue in that capacity also.

Franklin Farley, former president of Westvaco, will serve as management consultant to the FMC chemical divisions.

► **Ammoniators*** ► **Coolers** ► **Dryers**
 ► **Elevators**
 ► **Granulators***
 ► **Conveyors**

*TVA Licensed Manufacturer

**FOR THE
FERTILIZER
INDUSTRY**



Renneburg
**Continuous
 Combination
 Ammoniator-Granulator**

SAVES MONEY—Costs less to buy . . . costs less to operate • **SAVES TIME**—Ammoniation is going on at all times . . . no loss of time in charging or discharging • **SAVES SPACE** • **HIGHER RATE OF AMMONIATION** • **FLEXIBLE**—any retention time can be acquired . . . speed of rotation and bed depth can be easily increased or decreased.

Renneburg
**DehydrO-Mat
 Dryer**

Built in a wide range of sizes, the DehydrO-Mat Dryer, though comparable in price, out-performs conventional dryers of similar volume. Compact, it is easy to install in a minimum of space. The varying diameter cylinder regulates air and material velocities . . . controls temperature drop and product retention time . . . assures gentle drying.

Other chemical and fertilizer processing equipment manufactured by Renneburg includes: • Ammoniators • Granulators • Dryer Furnaces • Complete Air Handling Systems • Pilot Plants • DehydrO-Mat Combination Dryers and Coolers

Write for free informative bulletin: "Renneburg Continuous Granular Fertilizer Equipment"



Edw. Renneburg & Sons Co.

2639 BOSTON STREET, BALTIMORE 24, MD.

Pioneers in the Manufacture and Development of Processing Equipment for over 80 years.

**DOES YOUR LINE OF FORMULATIONS INCLUDE
BOTH OF THESE BIG-MARKET INSECTICIDES?**

Parathion

and

**You can get both
from Monsanto and
offer growers proved,
low-cost control of:**

- **RESISTANT BOLL WEEVIL IN COTTON**
- **SPOTTED ALFALFA APHID**
- **YIELD-REDUCING CITRUS PESTS**

Methyl Parathion

Methyl Parathion . . . recommended for sure weevil control.

While boll weevil is showing resistance to some insecticides that *used* to do a good job, Methyl Parathion offers full, *complete* control. It also controls cotton aphid, some species of spider mites, cotton leaf perforator, cotton leaf worm. Formulates into dusts, wettable powders and emulsifiable concentrates.

Parathion for citrus pests. Only Parathion controls all these citrus

pests at lowest cost per acre:

citricola scale	yellow scale
cottony-cushion scale	aphids
purple scale	little fire ants
California red scale	mealy bugs
	orange tortrix
	plant bugs
	thrips

Parathion for spotted alfalfa aphid: Only Parathion and community-wide spray programs can combat the insect pest that has caused a loss of over \$80,000,000 in alfalfa production in the three-year period, 1954 through 1956.

For more information about either Parathion or Methyl Parathion write:

Organic Chemicals Division
MONSANTO CHEMICAL COMPANY
Dept. AG-1, St. Louis 1, Missouri



THE MAN WITH THE



MULTIWALL PLAN

**UNION
PACKAGING SPECIALIST
J. R. GARMON**

**takes
40,000 lbs.
off a
packer's
shoulders**



Lifting twenty tons of filled bags a day is a lot of labor. It's inefficient, too, as a large chemicals producer learned during a recent survey of his Multiwall operation made by Union Packaging Specialist J. R. Garmon.

Garmon suggested a new system of *sliding* the customer's bags from the check-weigh scale to the bag flattener. This would not only relieve packer fatigue of manually lifting a 40,000 lb. bag load each day, but also assure full-capacity, full-

time operation of the bagging equipment.

Union Multiwall Recommendations
are based on this 5-star
Packaging Efficiency Plan



- DESIGN
- EQUIPMENT
- CONSTRUCTION
- SPECIFICATION CONTROL
- PLANT SURVEY

Another recommended economy tip: redesign style, proportion, and construction of existing multiwall bags. This will result in annual savings of \$1400 to \$8000 for each 450 M of the various size bags used.

Such savings are not unusual when Union's 5-Star Packaging

Efficiency Plan goes to work for a company. Write for complete information about this Plan. It costs nothing. There is no obligation.

Better Multiwall performance
through better
planning



UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

UNION MULTIWALL BAGS

UNION BAG - CAMP PAPER CORPORATION

233 BROADWAY, NEW YORK 7, N. Y.

Regional Sales Director



John R. Hale, manager of the Chase Bag Co. branch in Minneapolis since 1937, has been appointed Midwestern Regional Sales Director for the firm. Included in the Midwestern region are the Minneapolis, Kansas City, Chicago, and Milwaukee offices of the Chase Bag Co. Mr. Hale makes his headquarters in Minneapolis.

Cornell Dept.'s 50th Year

The Golden Jubilee of the founding of the Department of Plant Pathology at Cornell University was celebrated on September 27 and 28 in Ithaca, N. Y. The department, believed to be one of the oldest in the world, was set up by Liberty Hyde Bailey, Director of the New York State College of Agriculture and Experiment Station, on October 1, 1907 under the leadership of Professor H. H. Whetzel.

Invitational papers were presented at the celebration by alumni S. E. A. McCallan of the Boyce Thompson Institute on "The Nature of Fungicidal Action;" Stuart Younkin of Campbell Soup Co. on "The role of Plant Pathology in the Food Processing Industry;" W. D. McClellan of the U. S. Department of Agriculture on "Effect of Light on Fungi" and L. M. Black of the University of Illinois on "Viruses, Vectors and Vegetables." Dr. James G. Horsfall, Director of the Connecticut Agricultural Station gave a University Lecture on "The Fight with the Fungi."

Gulf Names Two

John T. McDonnell and James K. Sorgini have joined the chemical marketing group of the petrochemicals department, Gulf Oil Corp., Pittsburgh, Pa.

Mr. McDonnell is located at Houston, Texas, and Mr. Sorgini is in the Pittsburgh office.

U. S. Borax Mojave Mine

The U. S. Borax & Chemical Corp., Los Angeles, has completed a new open pit mine and refinery in the Mojave Desert area of Southern California which is expected to boost

the total American output of borate products by 30 per cent.

Designed to be a fully mechanical operation from pit to finished product, the project represents an investment of \$20,000,000 and more than two year's work.

Scab Control By Air Spray

Airplane applications of Crag Glyodin fruit fungicide gave apple growers good scab control this season in New York state and parts of New England, according to Union Carbide Chemicals Co., Division of Union Carbide Corp., New York.

Reports from the company's field representatives indicate an increasing number of growers are experimenting with airplane spraying. Orchardists in the past generally have believed this type of treatment is not as effective as spraying with traditional ground equipment.

Main objection in the past has been that sprays or dusts do not cover the underside of leaves and fruit, nor adequately penetrate the tree.

NATA Surveys Aerial Applicators

A measure of the average aerial applicator concern of 1956 has been obtained in a survey completed by the Agricultural Activities division of the National Aviation Trades Association, Washington, D. C.

The survey constituted a sampling of about one in every 15 applicators and covered 30 of the most active agricultural states. The average air applicator of 1956 showed up as having a capital investment of \$48,000 with an income of \$58,400. His revenue flying totaled 761 hours for the year and was accomplished in 5.2 months of operation. In this period he treated slightly over 57,000 acres. 9.2 persons were utilized thru either full or part-time employment.

Spraying in 1956 outran dusting in acres covered by 4 to 1, with fertilizing the next in order of acres covered. Regarding aircraft in use, Piper models were reported in excess of any other type. Only 5 per cent reported using multi-engine aircraft and the average planes in use per concern ran 4.2 for the year..

Monsanto Offices Move

General offices of Monsanto Chemical Co., have opened for business at a new location in St. Louis, Mo., culminating a program for administrative office consolidation with started more than seven years ago.

Office equipment for the approximately 1,500 persons involved has been moved to the group of new buildings just completed on a campus-like setting at Lindbergh and Olive Street Road in St. Louis County.

The move has no connection with the operation of the three large manufacturing plants which the company has in the St. Louis area, including the John F. Queeny Plant, the Carondelet Plant, both in St. Louis, and the William G. Krummrich Plant at Monsanto, Ill.

The new facilities consist of three identical office buildings, an executive building and a utility building located on a rolling 252-acre tract. The three principal buildings each contain three floors and together provide more than 300,000 square feet of office space.

In the survey, air applicators were asked what chemical products they felt were needed for particular pests and crops which are not presently available. Of particular interest is the fact that the need for a herbicide to control wild oats in wheat and small grains was the single most mentioned item in the reports. The need for a selected grass killer to control cheat grass in wheat, a herbicide for wild buckwheat in wheat and small grains, and a non-toxic chemical to fight the aphid in alfalfa and clover also were mentioned several times.

The largest problem faced by air applicators seems to be a personnel problem. Qualified and adequate personnel, with special reference to pilots, was listed by 25 percent of the applicators as their biggest problem. Some 23 percent listed weather as their greatest problem, with noticeable reference being made to the existing limits under which present sprays can be used with respect to wind and the need for expansion in this limitation.



Are you getting your share of the profitable **NITROFORM®** MARKET?

ONLY NITROFORM
CAN SUPPLY A TRUE UF (urea-form)
that guarantees an A-1 greater than 40

Look at the Turf Market — over 14 million acres

LAWNS

850,000 acres

GOLF COURSES

250,000 acres

HIGHWAYS

1,000,000 acres

INSTITUTIONS

100,000 acres

ATHLETIC FIELDS

150,000 acres

PARKS

225,000 acres

CEMETERIES

500,000 acres

AIRPORTS

over 1,000,000 acres

**Plus — The Greenhouse, Nursery
and Special Crops Market**



NITROFORM
AGRICULTURAL CHEMICALS, INC.

92 Sunnyside Avenue • Woonsocket, Rhode Island

There is a tremendous profitable market today for mixed fertilizers containing "all-blue" 38%-N NITROFORM . . . and with good reason. For wherever good turf is desired, good feeding with a minimum of cost and labor is important.

Look at the advantages of adding "Blue Chip" NITROFORM to your mixed fertilizer products.

- Saves repeated feedings because one application supplies vital, slowly released nitrogen all season. This cuts maintenance, storage, shipping and handling costs.
- Nitroform mixes easily, is clean, non-leaching, non-burning, non-toxic.

We would be pleased to help you make up a formula with "Blue Chip" Nitroform best suited to your needs. Just drop us a line.

28 Contribute To 4-H Fund

Twenty-eight companies had contributed to the industry-wide campaign being carried on in behalf of 4-H Club work as of Oct. 1.

John V. Collins, president of the Federal Chemical Co., Louisville, and R. E. Bennett, president of Farm Fertilizers, Omaha, are heading the campaign and have expressed the hope that the fertilizer industry will again be among the top contributors to 4-H work.

Dr. Gump Joins MCC

Dr. J. R. Gump has joined the Michigan Chemical Corp., Saint Louis, Mich., as group leader in charge of organic research. Dr. Gump was recently with the Heavy Minerals Co. as a senior research chemist.

In his present position Dr. Gump has charge of research on rare earth compounds and other inorganic chemicals which are manufactured by Michigan.

TVA Makes 1% Of Fertilizer

The Tennessee Valley Authority said recently that phosphate and nitrogen fertilizers it produced during the 1957 fiscal year represented a little over one per cent of the fertilizer consumed in the nation during the 1955-56 crop year. Total TVA production was 266,000 tons.

It was used by some 3,000 test-demonstration farmers for experimental application, or was sold to farmer cooperatives and fertilizer dealers for use in educational programs, the TVA said.

Meyer Starts Expansion

Construction was begun recently in Los Angeles for an office building, warehouse, and bulk storage facilities for Wilson & Geo. Meyer & Co. and Wilson Meyer Co., Pacific Coast sales representatives for Eastman Chemical Products, Inc., a subsidiary of the Eastman Kodak Co., Rochester, N.Y.

The new installation is expected to double the Meyer firm's present Southern California space. The bulk storage facilities will consist of four 15,000-gallon underground tanks and

one 6,000-gallon surface tank for blending certain plasticizers. The plant is expected to be completed in Feb., 1958.

Rose Gets Spencer Award

Dr. William Cumming Rose, an Illinois biochemist, has been selected as the 1957 recipient of the Charles F. Spencer Award for meritorious contribution to agricultural and food chemistry. The award is sponsored by Kenneth A. Spencer, president of the Spencer Chemical Co., Kansas

City, Mo., and is administered by the Kansas City section of the American Chemical Society.

Dr. Rose, professor emeritus at the University of Illinois, has been active in biochemical research for forty-five years. His experiments in the field of protein and amino acids have enabled farmers to develop balanced protein diets for farm animals without overfeeding, and have established the required knowledge of these amino acids which are dietary essentials.



New Modern Plant Where SER-X is Produced

SER-X is a potassium hydrous alumina silicate of the following analysis: SiO_2 73.08%, Al_2O_3 13.70%, Fe_2O_3 3.12%, TiO_2 0.54%, CaO 0.30%, MgO 1.14%, Na_2O 0.22%, K_2O 5.42%, Ign. Loss 2.54%, Fusion Point Cone 12.

Processed from Sericite ore, **SER-X** has an average particle size of 3.5 microns and a bulk density of 40 pounds per cubic foot. **SER-X** is inert, non-hygroscopic and non-shrinking. The particles are flat. Because of these physical and chemical properties it has proved ideal as a diluent in the formulation of agricultural insecticide dusts.

For Technical Literature and Samples, Write Dept. AC 1



The Test Proven
Insecticide Diluent

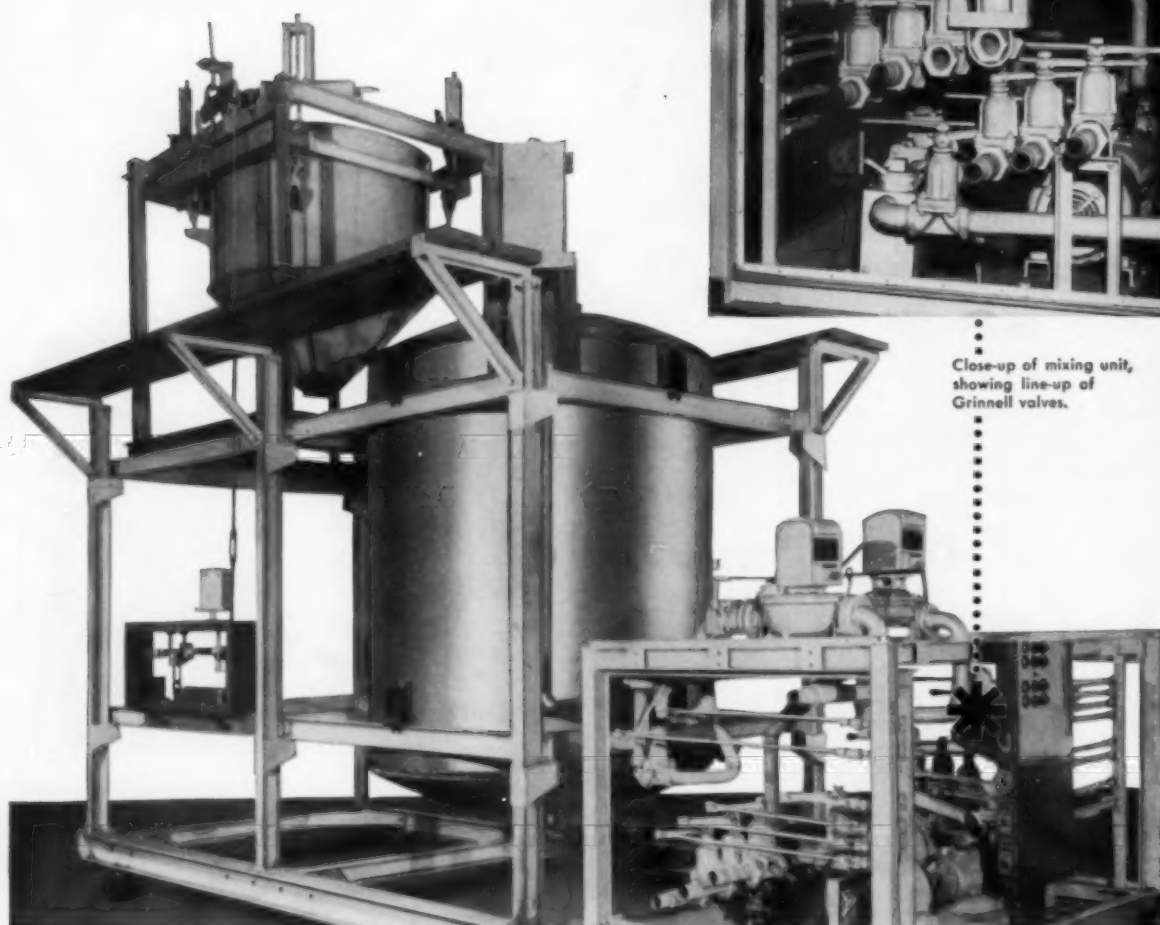
Formulators Report
Excellent Results

* Registered Trade Mark

SUMMIT MINING CORPORATION

BASHORE BUILDING

CARLISLE, PENNSYLVANIA



Close-up of mixing unit, showing line-up of Grinnell valves.

Liquid Fertilizer Mixing Plant Relies on GRINNELL-SAUNDERS DIAPHRAGM VALVES

As original equipment on Standard Steel Mfg. Co.'s efficient liquid fertilizer mixing plant are 14 quick-acting Grinnell-Saunders Diaphragm Valves. The choice of these valves was dictated by a number of important considerations. The quick shut-off feature of the $\frac{1}{4}$ -turn Grinnell-Saunders valve was one. But most persuasive was the design principle of this diaphragm valve. The diaphragm of the Grinnell-Saunders valve absolutely isolates operating mechanism from corrosive fluid in the line. This resilient dia-

phragm assures leakproof closure, even if grit or scale are in the line. Maintenance, too, is simple. The diaphragm may be replaced without removing the valve from the line. No refacing or reseating is necessary.

Bodies are of cast iron (plain or rubber lined), aluminum, stainless steel; diaphragms are of rubber, neoprene, or other synthetics. For further facts, write Grinnell Company, Inc., 235 West Exchange St., Providence, Rhode Island. Branches in principal cities.



GRINNELL-SAUNDERS DIAPHRAGM VALVES

Equipment, Supplies, Bulletins

Chapman Can Printer



The Metal Products division of the Chapman Chemical Co., Memphis, has developed a portable printing device for printing labels, instructions, and other matter on five-gallon cans. The machine can print up to 500 cans an hour.

Called the Chapco Print-a-Can Printer, the machine's operation is mechanical, requiring no electric or air power.

Vulcan Adds 55-Gallon Drums

Vulcan Containers Inc., Bellwood, Ill., has expanded its production of steel containers to include 55-gallon drums. Vulcan is offering a full line of open and closed head 55-gallon steel drums, manufactured to comply with universal standard dimensions, and to meet I.C.C. and uniform freight classification specifications.

The open head style will be furnished with the lever or bolt locking covers. For product and company identification, the drums can be decorated, striped, or painted any solid color.

New Michigan Closure Seal

A new type of closure seal for seamless methyl bromide cans has been developed by the Michigan Chemical Corp., Saint Louis, Mich.

Two years of tests of the new seal have included warehouse storage, high-temperature accelerated storage,

and sample shipments under highly adverse hot-temperature conditions. The company is seeking patent protection for the new device which overcomes leakage and seepage.

New Du Pont Urea Booklet

A new booklet on urea ammoniating solutions, including detailed unloading and handling instructions, has been issued by the Polychemicals Department of E. I. du Pont de Nemours & Co., Wilmington, Del.

The booklet contains charts and tables offering complete information on the characteristics of Du Pont's urea ammoniating solutions. Copies of the booklet on uramon may be obtained from the company's Polychemicals Department.



FOR DUST FORMULATORS ONLY

The leaf shown above is infested with aphids. These tiny sap-sucking insects seldom move more than a few inches a day. This sluggishness and their manner of feeding require the deposition of a contact insecticide on these hard-to-kill insects. Coverage of the entire plant surface is necessary for adequate control.

The characteristics of any dust reflect the quality of the diluent used. Most

dusts have less than 20% toxicant; the remainder is an inert diluent with which the toxicant must be in intimate contact for maximum effectiveness.

PYRAX ABB, the most compatible diluent with workable bulk density, imparts flow and anti-caking properties to dust mixes. **PYRAX ABB** promotes electrostatic dispersion of the dust cloud, assuring coverage of the entire plant surface.



R.T. VANDERBILT CO.

SPECIALTIES DEPARTMENT

230 PARK AVENUE, NEW YORK 17, N. Y.

Please send ☐ Bulletin 23D ☐ Sample **PYRAX ABB**

NAME _____

POSITION _____

(please write on or attach to company letterhead)

USE
THIS
HANDY
COUPON



KILL 'em now! Kill 'em all!

DIAMOND agricultural chemicals are sure death for crop-wasting pests. Formulators, farmers and fruit growers rely on DIAMOND's dependable quality. If you're looking for development co-operation, consult our experienced technical staff. Just write DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.



DIAMOND INSECTICIDES AND HERBICIDES

- DDT
- BHC
- LINDANE
- Grain Fumigants
- MITICIDE K101 (Ovex)
- 2,4-D Weed Killers
- 2,4,5-T Brush Killers
- Hexachlorobenzene
- Wettable powders, dust concentrates, emulsifiable concentrates and oil solutions based on our technical grade chemicals.

Tennessee Corp. Bulletin

The Tennessee Corp., Atlanta, Ga., has issued a bulletin describing their chemicals for industry and agriculture derived from sulfur, copper, manganese, zinc, and iron.

Among the agricultural chemicals described are: copper sulfate, monohydrated zinc sulfate, manganese sulfate, ferric iron sulfate, and light and dense copper carbonate. The bulletin is printed in three colors and is available from the company's organic chemicals division.

Stauffer Offers Leaflets

How major soil pests can be controlled by soil fumigation is described in a series of three new leaflets published by Stauffer Chemical Co., New York.

Practical procedures are outlined for the use of Vapam to kill annual and perennial weeds and germinating weed seeds, soil fungi which cause seed decay and damping off, nematodes and such insect pests as the garden centipede.

Each of the leaflets deals with a specific agricultural problem—growing finer turf, flowers and shrubs, and vegetables.

Vegetable-Oil Emulsifier

A vegetable-oil source liquid surfactant, "Sole-onic PGE," is described in a technical bulletin prepared by the Sole Chemical Corp., Chicago.

The emulsifier can be used as a wetter-sticker adjunct for agricultural sprays, an anti-corrosion agent in water-containing aerosols, an anti-foamer in sugar cooking systems, and an emulsifier for edible oil compositions.

General Metals Catalogue

General Metals, Inc., Greensboro, N. C., has published a condensed catalogue on their line of equipment for nitrogen solutions and complete liquid fertilizers.

The General Metals line extends from storage tanks to field applicators. The line includes tanks of aluminum, steel, and stainless steel; two-wheel trailer applicators; tractor ap-

plicators; 3-point hitch applicators; and "nurse tank" transports. The booklet, condensed catalogue number 10, is available from the company.

New Slimicide Bulletin

A technical bulletin on El-Tox a new metallo-organic slimicide, is available on request from the United Chemical Corporation of New England, Providence, R.I.

El-Tox is a new concept in slime destruction and control which actively seeks out and concentrates on slime and destroys it in all parts of the system, according to the manufacturer.

Pest Infestation Report

The Department of Scientific and Industrial Research, London, has published a report of pest infestation research during 1956.

The 64-page report is an account of the proceedings of the Pest Infestation Research Board and includes chapters on: biology, grain storage and mycology, insecticides, fumigants, and biochemistry.

A chapter on colonial liaison also is included.

The book is available in the U. S. from the British Information Services, 45 Rockefeller Plaza, New York.

Corn Borer Control Leaflet

The Canada Department of Agriculture is offering a booklet by H. B. Wressel titled, "Granular Insecticides for Control of the European Corn Borer in Field Corn."

The illustrated folder, publication 1014, describes the rates of application, the equipment, and the ideal time for applying the granulated DDT.

Morrow Plots Report

The University of Illinois, Urbana, has issued a booklet on the Morrow plots, which were established in 1876 and comprise America's oldest experiment field.

The plots have been used since 1904 to test three cropping systems of corn. Results of the tests indicate that crop rotation and fertilizers will maintain fertility in soil for some time.



**specialists
in magnesia
for agriculture**

EMJEO (80/82% Magnesium Sulphate) Calcined Brucite (fertilizer grade) 65% MgO

POTNIT

(95% Nitrate of Potash) for Special Mixtures and Soluble Fertilizers • Other Fertilizer Materials

**Insecticides
Fungicides**

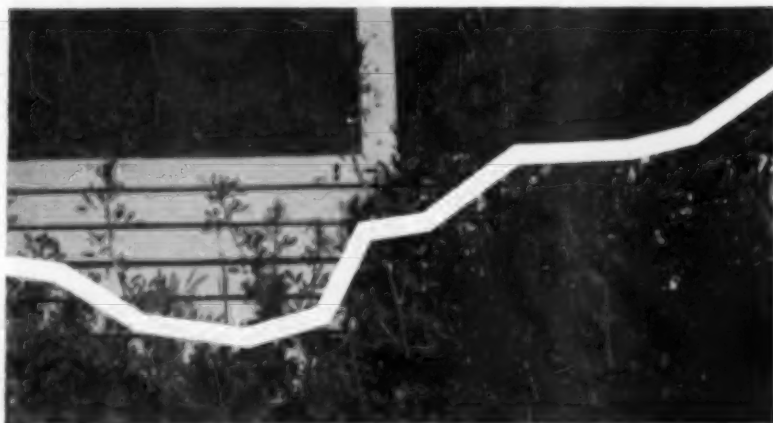
EXPORT

IMPORT

**Berkshire
Chemicals**

INC.

420 LEXINGTON AVE., NEW YORK 17, N. Y.
BOSTON • CHICAGO • CLEVELAND
PHILADELPHIA • SAN FRANCISCO



In a Washington State test, sweet clover responds to moly fertilization with yield of 1.5 tons of hay per acre (area at right). Control area (left) yielded only 0.7 ton per acre.

(Photo courtesy State College of Washington).

Average yield or high production? Moly may make the difference

Moly can give striking increases in yields, even on land farmers thought was "good enough"

During the past few years agronomists and many farmers have witnessed the dramatic upturn of crop yields when small additions of molybdenum were made to moly-starved soils. These results have been widely reported, and today the more obvious symptoms of moly-starvation are quickly recognized by most county agents.

But how about the much larger areas where moly-deficient soils might be described as undernourished rather than starved? Here moly can make the difference between average yields, average quality, average profits and high yields of premium quality crops that mean extra income.

At the present time these areas of potential response to moly treatment are known to include large parts of the eastern U.S. and much of the arable land of the Pacific Northwest. They take in many productive farms whose owners, lacking a standard of comparison, are reasonably satisfied with present yields.

In these areas, tests by experimental stations and growers alike have established that moly applications can boost yields by 12 to 93%. Although such improvements are not perhaps as spectacular as in moly-starved soils, they have already added to the profits of individual farmers. Broad-scale treatment of these undernourished soils can

contribute substantially to overall farm production.

How Moly Works

A fact that has emerged from many studies of micronutrients is that moly is essential to nitrogen fixation. Legumes require moly for the fixation of atmospheric nitrogen by the bacteria in their root nodules. All crops need it to reduce nitrates to nitrogen—the first step in protein synthesis.

When there isn't enough available moly in the soil to satisfy plant requirements, crops literally starve to death (as in the case of serious, visible deficiencies), or achieve only a fraction of their potential growth (as in the case of many fields with "normal" productivity).

On the other hand, small amounts of moly have given both substantial increases in crop yields and marked improvement in quality to many farmers who were once content with fair to average production. In many cases alfalfa has a higher protein content when "normal" fields are treated with moly. Cauliflower runs to large size, more succulent flavor.

Consider the effect of moly on a typical few of the 30-odd crops for which responses have been reported:

Alfalfa—In field tests in New Jersey, Dr.

Harold J. Evans of Rutgers University obtained an average increase in yield of 13%, marked improvement in protein content. In field tests in Spokane County, Washington, Dr. H. M. Reisenauer of the State College of Washington found that treating molybdenum deficient fields with moly increased yields an average of 40%.

Melons—A Virginia grower reports that with moly treatment he gets an average of 7 runners per vine with each runner bearing a large melon. Untreated plants bear fewer runners, much smaller fruit.

Peas—In eastern Washington and northern Idaho, where both dry edible and seed peas are a major crop, commercial use of moly is producing more peas per pod, more pods per vine. And vines are longer, easier to harvest. Yield increases in commercial tests have averaged 63%. Many farmers realize a return of \$10 on each dollar invested in moly.

Cauliflower and Lettuce—Growers on Long Island and in upstate New York, in Rhode Island and mid-New Jersey report more vigorous cauliflower plants with heads of better quality. Color and leaf structure of lettuce improved. Yields were consistently higher than for untreated fields.

Testing is Easy

Although crops vary in their moly requirements and responses vary with soils, there is one sure way for a grower to find out whether he can increase the yield and quality of a particular crop on a particular soil: run a field test. It's easy to do.

A stock solution for such tests is made by dissolving one ounce of sodium molybdate in one gallon of water. For vegetable crops, select and mark one or more rows through the center of the field. Mix three cups of the stock solution with one gallon of water and apply to the test rows, using about a quart to a 250-foot row. Compare the test rows with untreated rows every other day. Check yields and quality against untreated areas at harvest.

For legumes, lay out a test plot 10 yards square in a location that will make it easy to compare with untreated soil. Follow the usual fertilizer plan, but do not use nitrogen on either the test plot or the control areas. Spray the test plot with three cups of stock moly solution to a gallon of water. This may be done at the time of seeding, or to an established stand. Because increases of 25% or less are difficult to evaluate visually, clipping tests should be made.

For detailed information on the handling of moly test plots write Climax Molybdenum Company, Dep't. 43, 500 Fifth Avenue, New York 36, N. Y.

AGRICULTURAL CHEMICALS

BREVITIES

NELSON J. DAVIS has been named Texarkana division manager for the Reade Manufacturing Co., Jersey City, N. J. The company is building a plant for manufacturing herbicides at Texarkana, Ark., which is expected to be completed next spring.

AC

AHOSKIE FERTILIZER CO., INC., Ahoskie, N.C., has been granted a North Carolina State charter. The incorporators are; S. S. Pierce of Ahoskie, Luther Powell of Windsor, and P. A. Lewis of Jackson. Authorized capital stock is \$100,000.

AC

DR. H. L. WEBSTER, former dean of the school of agriculture and director of the experiment station at North Dakota Agricultural College, Fargo, died recently at his home in Fargo. His age was 74.

AC

THE MISSISSIPPI FEDERATED CO-OPERATIVES, Jackson, Miss., has selected a 36 acre site north of New Albany, Miss., for a \$325,000 mixed fertilizer and superphosphate plant. The plant is expected to be in operation next spring.

AC

THE PLANT of the Southwest Fertilizer and Chemical company at Odessa, Texas, was destroyed by fire of undetermined origin last month. Loss was estimated at several hundred thousand dollars by W. G. Nelson, general manager of the firm.

AC

DR. OTTO RAHN, professor of bacteriology at Cornell University from 1927 to 1949 and then at Idaho State College until 1954, died recently in Millsboro, Del. His age was 76.

AC

THE UNION CARBIDE CHEMICALS Co., Division of Union Carbide Corp., New York, has moved its

New Orleans District Sales Office to 4833 Conti Street. The new telephone number is AMherst 5301.

AC

C. E. BRISSENDEN has been named director of market development for the fertilizer division of the J. R. Simplot Co., Pocatello, Idaho. He was formerly manager of the Platte Valley Fertilizer Co., Scottsbluff, Nebr., a Simplot subsidiary.

AC

DR. CLARE B. KENAGA has joined the research staff of Panogen, Inc., as a plant pathologist. He is conducting research and field development work for both Panogen and its affiliate, Larvacide Products, Inc., from the Panogen research laboratory at Woodstock, Ill.

AC

THE ROANOKE-CHOWAN CHEMICAL CORP., Ahoskie, N.C., has been granted a North Carolina State charter to deal in chemicals or insecticides. The authorized capital is \$100,000.

AC

THE MICHIGAN CHEMICAL CORP., Saint Louis, Mich., has named Theodore L. Smith to its research staff at Saint Louis. Mr. Smith is assigned to the company's organic research laboratories.

AC

FRANCE'S FIRST commercial plant for the manufacture of maleic anhydride recently was placed in operation by the Compagnie Francaise des Matieres Colorantes (Francolor) at Villers-St. Paul, about 30 miles north of Paris. The plant was designed by Scientific Design Co., Inc., New York.

AC

RICHARD P. HARTMAN, agricultural agent in Ocean County, N. J., received a distinguished service award at the 42nd annual meeting of the National Association of

County Agricultural Agents in Boston on Oct. 17. Mr. Hartman was cited for his educational efforts and leadership in one of the fastest growing poultry counties in the nation.

AC

A LABOR DISPUTE at the Anglo-Lautaro nitrate plant in Maria Elena, Chile, was settled last month when workers agreed to accept a 30 per cent wage increase.

AC

MILO L. PRICE has been named Idaho-Mountain district sales representative for the Solar Salt Co., Salt Lake City. He is handling salt sales for agricultural and industrial uses.

AC

CHARLES C. CONCANNON, retired chief of the chemical division, Bureau of Foreign and Domestic Commerce of the United States Department of Commerce, died last month at his home in Boston. He was 69 years old.

AC

THE WASHINGTON OFFICE of the National Cotton Council has moved to new quarters in Room 502 of the Ring Building at 1200 - 18th Street, N.W.

AC

THE RICHARD SCALE CO., Clifton, N. J., has named H. E. Kennison as eastern regional manager to fill a post created by the opening of a new regional office in Clifton last month.

EQUIPMENT REVIEW

(From Page 49)

and at a convenient height for placing them on the truck bed. Among the units available from Farquhar for such an arrangement are the Model 431 heavy-duty power belt conveyor with a power belt feeder and the Model 439 Expand-O-Veyor expandable power belt conveyor.

Ammonia Applicator

KBH Corporation, Clarksdale, Miss., has recently introduced a new unit for applying anhydrous ammonia

to pastures and small grain crops where shallow applications are indicated. A scalloped coulter blade in front of the applicator knife slices the turf for easier pulling, and the rubber tired press wheel behind the knife seals in the ammonia. This unit is also used for applying anhydrous in heavy, black soils where sealing has been a big problem.

KBH Corp. also supplies self-propelled insecticide sprayers.

Dorr-Oliver Pan Filter

A vacuum filter of the traveling pan variety has been developed specifically for handling strong phosphoric acid in granular fertilizer plants by Dor-Oliver Inc., Stamford, Conn. Individual filter pans comprising the D-O filter are mounted on an endless rubber belt driven by sprockets. In operation, feed is distributed evenly across each pan. As the pans move forward, vacuum is applied through slots in the rubber belt, drawing filtrate into a collecting trough which may be divided to collect as many as twelve individual filtrates. Major advantages of this filter are its flexible capacity, ability to operate with gravity feed, and the sharp filtrate separations possible. The traveling pan filters are available in five sizes with filtration areas ranging from 65 to 195 square feet.

Day Dust Filter

Day Co., Minneapolis, in the past year has added the "Type RJ" dust filter to its line of reverse jet dust filters. The new unit is reported to lend itself to all continuous process equipment, since no shut down is needed for rapping or cleaning.

Joy Dust Collector

The Joy Microdyne dust collector, offered by Joy Manufacturing Co., Pittsburgh, is said to be one-tenth to one-twentieth the size of comparable equipment. It can be mounted in existing duct work at the point of use. The Microdyne is a wet inertial type dust collector made up of three double walled cylindrical sections. The sections contain a water spray and an impingement screen assembly, a water eliminator, and a transition section to accommodate the axial flow fan. (See Advertisement p. 71).

Wheelabrator Dustubes

The Wheelabrator Corp., Mishawaka, Ind., manufactures dust collectors which can be adapted for almost any type of dust collecting work in a variety of industries. The dustubes are individually tailored for each specific job and, in addition to removing dust, recover chemicals lost at pulverizing and weighing stations.

TRANSPORTING UNITS

Tractomotive Tractor-Loader

The Tractomotive Corp., Deerfield, Ill., is offering a tractor-loader with power steering, clutch-type transmission, and hydraulic torque converter. The loader, Model TL-6, has a bucket capacity of $\frac{1}{2}$ cubic yard and has a turning radius of $6\frac{1}{2}$ feet. The bucket can be independently tipped back 50 degrees to retain a full load three feet from the ground. The short turning radius allows it to unload boxcars and get in and out of the narrow bins without excessive maneuvering. The loader has two forward and two reverse speeds and the clutch-type transmission enables it to reverse direction without shifting gears. Standard equipment includes an electric starter, generator, horn, oil bath filter, muffler, and hydraulic brakes.

Clark Tractor Shovel

Six basic models of the Tractor Shovel are offered by Clark Equipment Co., Benton Harbor, Mich. These range from 44 to 165 hp, with buckets from 6 cubic feet to 5 cubic yards. All units include power steering, forward and reverse speeds up to 26 mph, no-clutch shifting to change speeds and direction, shock absorbing torque converter with 3-to-1 torque multiplication.

Clark recently offered a new attachment for its tractor shovels, a high-lift bucket, which increases dumping height of the bucket by 3' 7". It raises the lower edge of the bucket to 12' 1". (See Advertisement p. 61).

Lewis-Shepard Power Master

The PowerMaster Model "RR" line of heavy duty fork trucks, manufactured by the Lewis-Shepard

Co., Watertown, Mass., features a new rear wheel gear drive powered by two heavy duty compound wound traction motors with an electric differential. The entire drive assembly is spring-mounted to assure constant traction on both drive wheels at all times.

Powermaster has 4 speeds forward and reverse with automatic acceleration and dynamic braking.

General Metals Transport

A trailer-mounted transport designed for hauling nitrogen solutions and liquid fertilizers from storage tanks to the farm and out to the field is produced by General Metals, Inc., Greensboro, N. C. The transport unit consists of trailer, saddles, tank, fittings, hose, gauges, air compressor, front end jack, trailer hitch. The aluminum tank holds 1,000 gallons.

Valley Craft Barrel Cart

Valley Craft Products Inc., Lake City, Minn., manufactures an all aluminum barrel truck equipped with two-wheel safety brakes. The tubular frame of the truck is constructed from heavy aluminum pipe and has a guaranteed load capacity of 1,000 pounds.

Hough Backrip Scarifier

The Frank G. Hough Co., Libertyville, Ill., manufactures a backrip scarifier which is used for removing solidly-packed fertilizer that accumulates on concrete runways and floors. The unit is attached to the bottom of the bucket of a payload and consists of a number of prongs which, when dragged along the floor, break up the packed fertilizer.

A & C Rubber-Lined Tanks

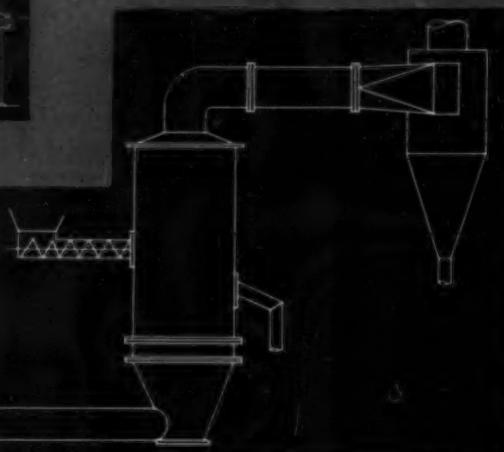
The problem of corrosion in storage and shipping is solved by Abrasion & Corrosion Engineering Co., Amarillo, Texas, with its line of rubber-lined tanks. A & C recommends these tanks for liquid fertilizer storage, phosphoric acid and nitrogen solutions.

Cole Aluminum Tanks

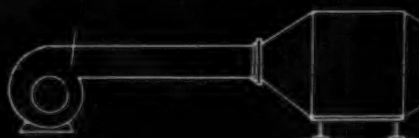
Measuring tanks in aluminum or stainless steel are carried as stock items by R. D. Cole Manufacturing Co., Newman, Ga., or can be built in all sizes to specification. Cole also



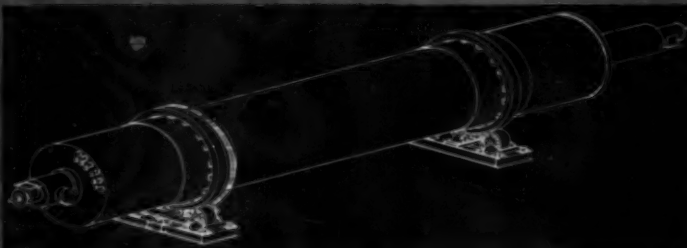
Continuous Atmospheric Rotary Dryer



Continuous Fluidized Bed Dryer



**Continuous Solvent Stripper
Continuous Gas Solids Reactor
Continuous Vacuum Dryer**



**Now, at one convenient
location, you can test-
dry your materials in
a variety of
equipment**

At General American's East Chicago pilot plant, you can test the drying or reacting of your materials in the widest range of drying equipment ever assembled in one place.

Louisville Dryer engineers will work with you—study your materials and needs, make recommendations for type of equipment, size and heating medium. You can check these recommendations for yourself through practical tests. Your Louisville Dryer is then engineered for most efficient and economical service—built specifically to meet your needs.

To test the drying of your materials in all these different types of drying equipment, call in a Louisville Dryer engineer. There is no cost or obligation.

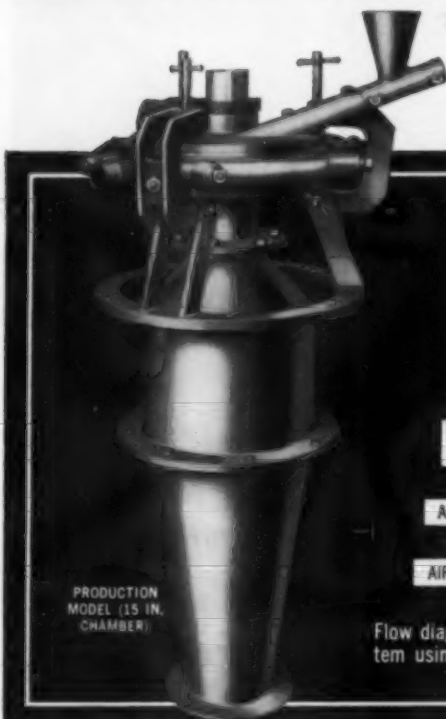
See us at the "Chem Show" Booths 436, 442 and 446



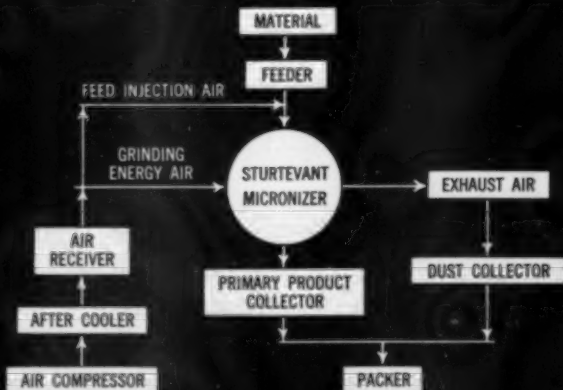
**LOUISVILLE DRYING MACHINERY UNIT
GENERAL AMERICAN TRANSPORTATION CORPORATION**

*Dryer Sales Office: 139 S. Fourth Street, Louisville 2, Kentucky • Eastern Sales Office: 380 Madison Avenue, New York 17, New York • In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada
General Offices: 135 South La Salle Street, Chicago 90, Illinois.*

Need 1/2 to 44 Micron Particles?



Sturtevant Micronizers* Reduce, classify in one operation — make 325 mesh obsolete



Flow diagram of Sturtevant designed micronizing system using compressed air. Steam also may be used.

Particles Grind Each Other, Classifying is Simultaneous; No Attritional Heat

One operation. Sturtevant Micronizers grind and classify in a single fluid-jet chamber — provide fines in range from 1/2 to 44 microns to meet today's increased product fineness requirements. Because of impact action and cool atmosphere, even heat-sensitive materials can be handled.

No moving parts. Particles in high speed rotation, propelled by compressed air or steam entering shallow grinding chamber at angles to periphery grind each other by violent impact. Design provides for instant accessibility, easy cleaning.

Simultaneous classification. Centrifugal force keeps over-size materials in the grinding zone, cyclone action in central

section of chamber classifies and collects fines for bagging. Rate of feed and pressure control particle size of fines.

Can combine other processes. Sturtevant Micronizers can be adapted for coating one material with another and for effecting chemical reactions and changes in physical characteristics, while in process of reducing solids to micron size.

Eight models available. Grinding chambers are in eight sizes, ranging from 2 in. diameter laboratory model (1/2 to 1 lb. per hr. capacity) to large 36 in. diameter production model (500 to 4000 lbs. per hr. capacity). Send today for fully descriptive literature.

LOWER MICRON MATERIALS SET NEW STANDARDS IN THESE FIELDS:

- Pharmaceuticals
- Pigments (natural and synthetic)
- Copper compounds
- Filler materials
- Aluminum compounds
- Resins
- Flour
- Sugar
- Calcium compounds
- Heat sensitive materials
- Magnesium compounds
- Zinc compounds
- Waxes and fatty acids
- Fungicides and insecticides

Fluid-Jet Systems For Special Needs

A 30 in. Sturtevant Micronizer is reducing titanium dioxide to particle size under 1 micron at a feed rate of 2250 lbs. per hr. For another firm, a 24 in. model grinds 50% DDT to 3.5 average microns at a solid feed rate of 1200 to 1400 lbs. per hr. A pharmaceutical house is using an 8 in. model to produce procaine-penicillin fines in the 5 to 20 micron range. Iron oxide pigment is being reduced by a 30 in. Micronizer to 2 to 3 average microns at rates of 1000 lbs. per hr. Sturtevant Engineers will help you plan a Fluid-Jet system for your ultra-fine grinding and classifying requirements. Write today.



CAN TEST OR CONTRACT MICRONIZING HELP YOU?

Laboratory test-micronizing of your own material, or production micronizing on contract basis, are part of Sturtevant service. See for yourself the improvement ultra-fine grinding can contribute to your product. Or, if you have limited requirements for ultra-fine grinding, Sturtevant's contract micronizing service may be the economical answer. Write for full details.

STURTEVANT

MILL COMPANY 123 Clayton St., Boston 22, Mass.

CRUSHERS • GRINDERS • SEPARATORS • BLENDERS • CONVEYORS • ELEVATORS

See us at the Chem Show . . . Booth 421

manufacture storage tanks to handle ammonia and nitrogen solutions, anhydrous ammonia—complete with fittings in aluminum, stainless or carbon steel, monel or other alloys.

MISCELLANEOUS

Ammonia Converter

A portable ammonia converter manufactured by J. C. Carlile Corp., Denver, is mounted on a trailer and has a speed up to 45 mph. Conversion is done directly from a railroad car of anhydrous ammonia, and no provision is needed for anhydrous ammonia storage. Conversion of a tank car of ammonia takes from four to seven hours.

B & L Complete Package Units

The Barnard & Leas Manufacturing Co., Cedar Rapids, Iowa, has developed a line of "Complete Package" units for processing neutral solution liquid fertilizers. They can be arranged in various combinations to produce a desired volume of finished neutral solution fertilizers, liquid mixed fertilizers, and/or liquid nitrogen. Among the units available in the package are a B&L Coactor, a complete installation; a B&L liqua-lizer for liquilization of solid plant foods for addition to neutral solutions; a B&L convertor for converting anhydrous ammonia to aqua ammonia; and the B&L autobatch for producing balanced liquid mixed neutral solution fertilizers by the batch type process.

Ludlow Wire Screens

Industrial wire cloth and screens of stainless, monel, bronze, copper, brass, oil-tempered, high carbon, and other wire are offered by Ludlow-Saylor Wire Cloth Co., St. Louis. The firm specifies stress-free assembly which avoids distortion of screen openings, resistance to abrasion, set and fatigue.

Hewitt Robins Screen

Hewitt Robins, Inc., Stamford, Conn. are introducing a new high speed vibrating screen. Called HS Vibrex, the screen is suggested for screening clay, fertilizer, chemicals, etc. It has a speed of 3300 rpm. Wet or dry materials may be screened.

Neptune Liquid Meter

A new stainless steel meter, allowing close metered control over corrosive solutions and chemicals which must be kept pure, has been developed by the Neptune Meter Co., New York. Based on the positive displacement principle, with only one moving element exposed to the liquid, the meter eliminates many of the hazards of handling corrosive liquids by measuring liquids inside the pipe. Meter casing and measuring chamber are of stainless steel. Capacity ranges from 20 gpm. minimum to 100 gpm. maximum for most liquids.

AO R56 Respirator

The American Optical Co., Southbridge, Mass., manufactures a respirator for use with phosdrin and other toxic substances used in farming. The respirator uses a new type of filtering material that effectively retains sub-microscopic airborne particles without offering any difficulty to breathing and a bed of activated carbon to remove toxic vapors and gases from the air. The

filtering material and the activated carbon are contained in an aluminum cartridge which fits into a face-fitting mask that covers the nose and mouth.

Mackwin F-P Sprayer-System

Mackwin Co., Winona, Minn., offers a package deal to granular fertilizer mixers who wish to include pesticides in their delivered product. The heart of the Mackwin system is a nozzle-sprayer which sprays carefully measured insecticide into the fertilizer material as it passes beneath it on a conveyor system. Mackwin Co. does not sell the equipment used in their system but makes an effort to advise manufacturers by offering catalogues and other literature which enables them to select the particular equipment needed.

Gustafson Chem-Soil Mixer

The Gustafson Manufacturing Co., Corpus Christi, Texas, has developed a Chem-Soil mixer for mixing fungicides with the soil at planting time. It comes in two models, the FM-O kit for planters without seed-

CHEMICALS FOR AGRICULTURE

COPPER SULPHATE

Crystals Powdered
Basic Copper Sulphate

ZEE-N-O

Neutral Zinc 56% Zinc as metallic
The Highest Test Nutritional Zinc

MANGANO

Neutral Manganese 55% Manganese as metallic

W. R. E. ANDREWS SALES, INC.

1505 Race Street, Philadelphia 2, Pa.

Since 1926

Agricultural Chemical Specialists

Difficult batching problems solved by Autoweightion*

- All types and combinations of materials successfully handled
- High degree of accuracy obtainable
- Thayer Scale Flexure Plate Leverage System guaranteed accurate for life



Fig. 1

The development of the Thayer Autoweightion System for controlling materials processing systems has opened the door for many hitherto impractical batching operations. For instance, several different flushing materials (flooding powders) can now be handled without leakage by a tipping bucket weigh hopper (Fig. 1) controlled by a series of different range Thayer weigh beams.



Fig. 2

Thayer individual batching scales can be used to furnish preweighed charges which may be varied in weight to suit the formula. The system shown (Fig. 2) can be furnished to allow positioning under various bins or feeders so each scale will preweigh a given weight charge and discharge it to a conveyor belt or to a mixer for further processing.



Fig. 3

Where many ingredients are to be handled and there is a factor of space saving and a minimum amount of equipment, it is possible to utilize an accumulative batching scale which can either be fixed or moveable as shown (Fig. 3).

This unit will have a large weigh hopper sufficient to accommodate the total weight of any number of ingredients desired to be accumulated. To secure accuracy in various weight ranges, the weighing of each individual ingredient will be controlled by its own weigh beam on the scale and the various ingredients will be weighed into the common weigh hopper in turn at the prescribed formulated weight.

Difficult to handle materials, such as hot tar, high viscosity liquids and other such ingredients which leave a residue in the weighing vessel can be handled in a loss-in-weight manner by first precharging a vessel to any weight and then withdrawing a known amount for the desired charge (Fig. 4). By this means the remaining tare weight within the hopper will not affect the weight of the next discharged load. Such a unit can be used either as a single batching scale or as an accumulative batching scale discharging in a loss-in-weight manner.



Fig. 4

Engineered solutions such as these have put Thayer batching systems into many of the best known processing plants in North America. Thayer builds a complete line of feeders interlocked with Thayer Scales. Remote controls, adding machines and chart indicators are also supplied. Please write us about your batching problems.

AUTOWEIGHTION

trade-mark

* THE THAYER SYSTEM OF
PROCESS CONTROL BY WEIGHT

THAYER SCALE CORP.

4 Thayer Park, Pembroke, Massachusetts

embedding wheels and the FM-K kit for planters with seed-embedding wheels. The FM-O has an extra long dust distributor tube, forward mounted soil scratchers, and flat covering discs. The FM-K has a shorter distributor tube attached between the seed embedding wheel and the press wheel.

Toledo Bulk Weigher

The Toledo Scale Co., Toledo, Ohio, is offering a bulk weigher that provides remotely printed and totaled net weight records of bulk material. The unit has a capacity of 50,000 pounds per hour. The basis of the unit is a Toledo suspension-type hopper scale from which is mounted a weigh hopper. Above the weigh hopper is a surge hopper, which receives the material and dumps it into the weigh hopper. Both hoppers are equipped with pneumatically-operated discharge gates and the scale indicating mechanism is equipped with a cutoff device.★★

WASHINGTON REPORT

(From Page 62)

observers see little change in the present trend toward larger farm operations, with the actual number of farmers continuing to diminish. Adjustments essentially will modify the "cushion" the government has placed under agriculture. Payments this year to farmers will exceed one billion dollars in one form of aid or another. Undoubtedly improvements can be made, and perhaps the cost cut, but economics will rule over politics.

USDA officials are running up warning flags telling the nation that we cannot continue the present rate of farm exports. Whether you call the present program "dumping," or regaining our rightful share of the market, it's doubtful we can continue to squeeze as many bushels into other countries as we've been doing.

Part of the operation of public law 480 requires that some of the funds from the sale of products within a country remain in the country to be used to promote the further use of surplus American products within that nation. While there's been some success, there are notable

AGRICULTURAL CHEMICALS

examples of where these funds have not been used and where the experienced manpower is not available to handle them.

On the other hand, Canada, for instance, is starting retaliatory action against the U. S. for taking what it believes part of its rightful wheat market. New Zealand is battling U. S. trade policy on butter. Other nations are clamoring over our cotton export policy.

At the same time, many groups plan to come to Washington as soon as Congress reconvenes and fight for added restrictions on importations of foreign goods. Thus it appears the trade war is intensifying. In many respects, it is led by the pressure of agricultural supplies, and even with heavy export subsidies it's doubtful we can even hold our own. Thus we face the prospect of continuing government controls of one kind or another and a highly regulated agriculture, whether by farmers themselves or by the government.

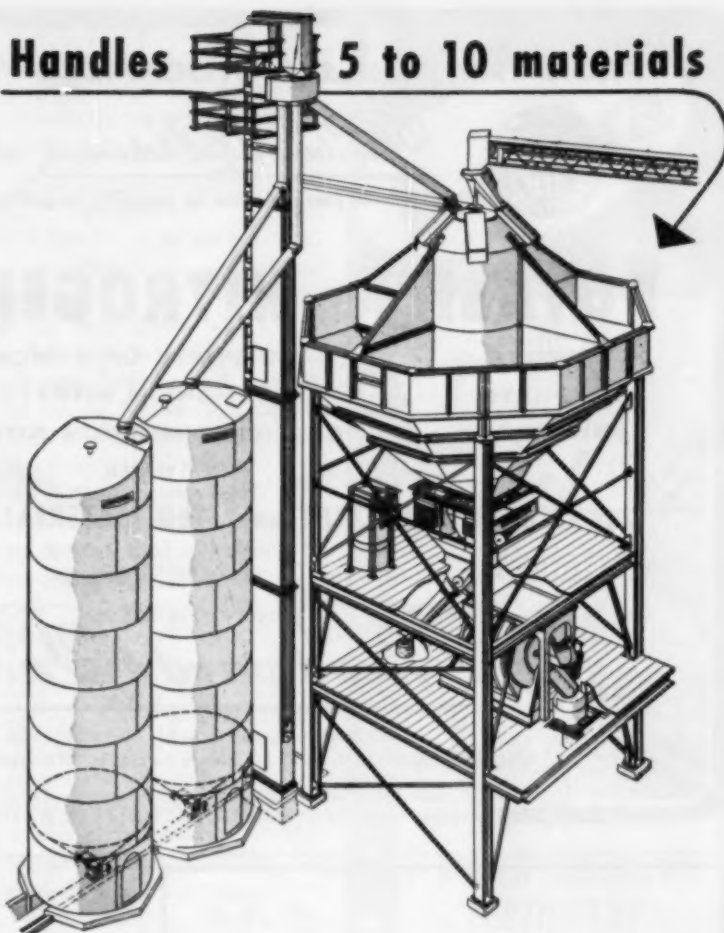
At this writing, they've caught one Mediterranean fruit fly in Florida since August 8. This comes close to being a record, and after all, it takes more than one fly to perpetuate the race. The sweet smell of success is on this campaign.

A federal quarantine is being considered as part of the fire ant control program. The U. S. Department of Agriculture has the authority to establish a Federal quarantine within one or more states after a public hearing is held.

Quarantines already are in effect for the soybean nematode and witchweed.

Witchweed control is getting more attention, the idea being to develop a Federal assistance program to encourage growers to plant trap crops and then destroy them, thereby causing the witchweed seeds to germinate but not reproduce. Over a three to five year period it's hoped this would rid soil of witchweed seed, although some scientists believe a longer period is necessary. Ideal trap crops are corn and sorghum.

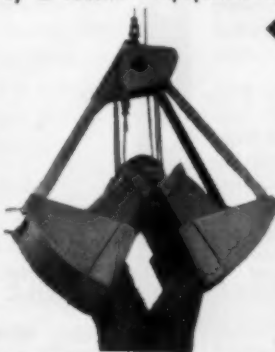
Handles 5 to 10 materials



Bin capacity: 150 to 1100 cubic yards

On fertilizer blending operations, multiple ingredients are instantly available with this Johnson Octo-Bin plant. Overhead storage bin has 4 to 8 compartments arranged around a centrally-located tank having 1 or 2 compartments. Tank is charged by chute from bucket elevator. Open bin compartments can be charged by a second elevator or belt conveyor, with pivoted distributor for feeding materials into proper section of bin. Plant can be arranged with clod-breaker, vibrating screen and collecting hopper for pulverizing and screening materials before they are fed into the bin. Single or multiple material batchers, with

manual or automatic controls, accurately weigh materials at high speed, and discharge into mixer for final blending operation. Let us show you how this multiple-material plant can be adapted to meet your specific requirements. Several other types and sizes of Johnson plants and accessory equipment also available.



Fertilizer buckets —

To stockpile, load and unload chemicals, fertilizers, and other fine-grained materials, Johnson brings you a special clamshell bucket. All-welded, smooth inside and out, it loads fast — gives quick, clean dump. Powerful closing action of hard manganese cutting lips prevents load leakage as you hoist and swing the bucket. 10 wide-rehandling sizes: $\frac{3}{8}$ to 3 cu. yds. See your Johnson distributor, or write to us.



C. S. JOHNSON Company CHAMPAIGN, ILLINOIS

(Kochring Subsidiary)

J 548

FROM THE WORLD'S STOCKPILES—TO YOUR PLANT...



Woodward & Dickenson serves you

with an 80 year reputation for reliability in quality, price and delivery.

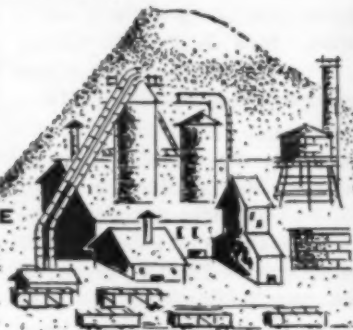
POTASH

MURIATE
SULPHATE
NITRATE

NITROGEN

SULPHATE OF AMMONIA
AMMONIUM NITRATE
CALCIUM AMMONIUM NITRATE
UREA

AND ALL OTHER FERTILIZER AND FEED MATERIALS



ESTABLISHED 1873
Woodward & Dickenson
Inc.

1400 SOUTH PENN SQUARE, PHILADELPHIA 2, PA., U.S.A.
TELEPHONE: LOcust 4-5600 Cable Address: "Woodward" TELETYPE: PH109

Branches in MADRID, MANILA, TOKYO, SEOUL, WASHINGTON, D.C., U.S.A.

Insist on the Best

INSCO

Soil Fumigant Applicators

An Applicator for
Every Nematode Problem

Write For Free Literature

manufactured by

INSECT CONTROL SALES & SERVICE

P. O. Box 152

Candor, N. C.

INDUSTRY ROUND TABLE

(From Page 32)

cooler? or possibly one could use cold air from an ammonia refrigeration unit to accelerate cooling?

Discuss advantages and drawbacks of a TVA cone mixer.

Are coating agents in granulation beneficial? When and how should they be introduced into the process?

Variation in density of fertilizers creates a problem in weight control at bagging units. Is there a practical way to counteract the density problem?

Can green phosphoric acid wet process be economically clarified so as to permit its use for direct application?

Is the addition of sulfuric acid to a mixture helpful or does it make the finished product hygroscopic? How does one prevent making a gummy product?

Can gas increase the life of sulfuric acid and nitrogen spray bars in rotary mixers?

SESSION V

Why is so much trouble experienced with the nitrogen content of high analysis 1-1-1 ratio fertilizers (12-12-12, 14-14-14)?

Are present official chemical analytical methods suitable to the analysis of granulated high-analysis fertilizers?

Discuss the merits, if any, of ammoniated superphosphate vs. ammonium phosphate based fertilizer.

Discuss the rise of nitric acid in the hydrolysis of calcium metaphosphate.

Discuss the influence of moisture content on quality of fertilizer.

What are major technical and economic aspects of liquid fertilizers vs. granulated?

Can sludges from green phosphoric acid be used in granulating fertilizers.

Discuss pros and cons of phosphoric acid vs. sulfuric acid in granulation.

The effectiveness of Washington's program to reduce production through Soil Bank is being answered as farmers complete harvesting this year's crops. Right now it looks as though total production this year will be almost a record!★★

FLUID GRINDING

(From Page 38)

this swing to finer particles. Health experts have long been concerned with the toxic effects of these insecticides on consumers of agricultural products, and it is most desirable to keep the concentration of toxicants on food-stuffs as low as possible. Fortunately it is recognized that minute quantities of the toxicant are effective in killing insects, and the problem resolves into finding a way to reduce the amount of residual toxicant on the plant without affecting its potency.

Reduced particle size may well prove to be the answer to this problem. For a given volume, surface area is sharply increased with a reduction in particle size. Toxic action is believed to be related to surface, and investigators are studying the possibility that the larger surface area resulting from finer grinds will result in a higher effective toxicity per unit weight. If this is borne out, concentrations can be reduced, and health objections to many toxicants will be lessened.

Pre-mixing and Blending

WE have said that one of the requirements for acceptance of these products is homogeneity. The violent turbulence within the fluid mill makes it ideal for blending while grinding. Simple pre-mixing of the toxicant, inert, wetting agents, stickers filling agents or other additives is all that is required to produce a perfectly uniform blend.

Preparation of the toxicant for introduction into mechanical mills has frequently been particularly troublesome. Expensive corrosion-resistant equipment and other accessories are often needed. Much of this expense can be eliminated with the fluid mill since the only requirement for the feed is proper proportioning and a feed size in the range of below 4 mesh. It is true that some of the problems con-

nected with the preparation of a few of these organic toxicants have not been entirely solved, but work being done now by the manufacturers of the mills looks most promising.

Effect of Fluid Grinding on Formulation

SELECTION of the inert material is important to the economics of pesticide manufacture. When the product is to be ground with a fluid mill, the properties of flowability, particle size, hardness and moisture content become far less important in the inert. Particle size of the inert and flowability of the toxicant are of only minor concern, since a four mesh feed is easily converted to the desired particle size in a fluid mill. Hardness becomes less important, since even materials such as pyrophyllite grind with essentially no mill wear.

Dehydration, and even removal of water of crystallization, are easily accomplished during grinding with the fluid method. Consequently, the dryness of the inert as it enters the mill, becomes of less importance. Quantitative studies are required to establish the maximum moisture content that can be tolerated with a given inert, but some clays with an initial 15% moisture have been dried, ground and blended with toxicants, all in one operation.

The original high oil absorption of cellular materials, such as the diatomaceous earths is retained fully in the fluid mill, since there is no compaction or mechanical crushing of the structure during grinding.

All of these factors point in one direction . . . lower cost, through upgrading of what have always been considered poorer quality inerts. Dependence on fixed grades of premium priced carriers and diluents is reduced. The availability of certain qualities becomes of less importance.

What the Future Holds

FOR the domestic processor who is considering plant expansion, or the replacement of obsolete equipment, the versatility and economy of this type of mill warrants serious consideration. For those who are interested in applications abroad, where the trend toward local processing of im-

Danitra



Quality Controlled CUSTOM PACKAGING of WATER SOLUBLE FERTILIZERS

We are now scheduling the 1958 requirements of manufacturers and distributors of concentrated, high analysis, water soluble plant foods. To such organizations we can offer highly accurate formulating and packaging in units of one pound or more . . . with the economies of specialized operation and production line speed. We make shipments under customers labels and shipping tags.

Our experience in blending and formulating should be most helpful to manufacturers projecting new fertilizer products. Our people are available for consultation at our modern packaging plant, Metuchen, N. J.

Davies Nitrate Co.

INCORPORATED

118 LIBERTY STREET NEW YORK 6, N. Y.

WELDED ALUMINUM TANKS

**In all sizes and types
for Nitrate Solutions**



Elevated Tanks, Pressure
Vessels, Chemical and
Processing Equipment
from Aluminum, Stainless
and Carbon Steel, Monel
and Other Alloys.

Established 1854



•COLE pioneered in building the *first* tank for nitrate solutions. We can supply you with welded aluminum tanks or pressure vessels for the storage or processing of agricultural chemicals, built to ASME specifications to meet all insurance requirements.

Pressure storage and corrosion-resistant storage facilities are typical of the many types of tanks we build especially for the fertilizer industry. Take advantage of our 103 years of specialized knowledge and experience. Write for booklet, *Tanks and Equipment for the Plant Food Industry*.

NOW IN 2 SCREEN SIZES

CAL-MAG OXIDES

CUT YOUR COSTS WITH

CAL-MAG OXIDES

MgO 40.39

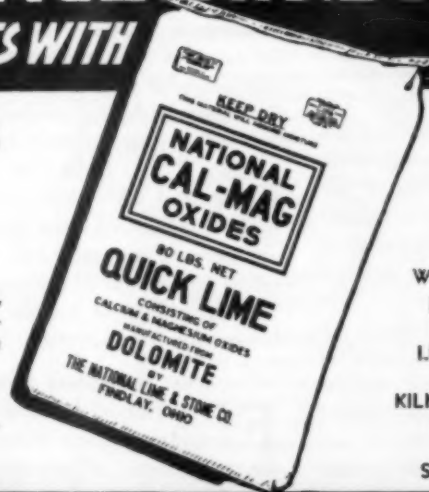
CaO 58.07

TNP 203.88

Unexcelled for its superior Dehydrating, Neutralizing, and Curing factors in the preparation of better fertilizers. Write for complete information.

PROMPT SHIPMENTS

Three railroads serve our Carey, Ohio plant—assuring prompt delivery—everywhere.



We Also Produce

DOLOMITIC

HYDRATED

LIME (165 TNP)

and

KILN DRIED RAW

DOLOMITE

(107 TNP)

Screened to size

The **NATIONAL LIME and STONE CO.**
General Offices FINDLAY, OHIO

ported toxicants with close-at-hand sources of inerts is already well established, the same consideration is even more imperative.

As more and more information on the operation, economic balances, and formulations possible with this mill are obtained, even more starting potential is foreseen.★★

WORLD FERTILIZER

(From Page 30)

market. On the other hand, no corresponding outlets abroad were found for American surplus. Since home sales stagnated in the fertilizer year 1955/56, large stocks of nitrogen fertilizers accumulated and prices fell.

In the last year deliveries of nitrogen and potassium fertilizers from U.S.A. to Asia became ever more important. However, the major part of these exports consisted of deliveries made under Foreign-Aid-Programs; any major reduction or discontinuance of this aid would have considerable influence on the import requirements of such Asian countries, and would probably lead to a decline in demand. The natural outlet for United States surplus of commercial fertilizer, is, from the angle of location, the American continent. Up to the present, however, demand in this area has risen very slowly. In the last few years, United States exports of phosphate fertilizers were mainly directed to other American countries.

The Far East market in chemical fertilizers has become particularly interesting in recent years as a result of its enormous and unexpected increase in nitrogen fertilizer imports. This is not to be attributed solely to Foreign-Aid-Program deliveries, but, to a large extent, is due to the rise in demand in some countries (primarily China) which do not come within the scope of any such program. Far Eastern imports in the past years have decisively contributed towards absorbing surpluses which otherwise would have glutted the world market.

As far as production capacity and transport advantages allowed, the Japanese chemical fertilizer industry took advantage of the heightened de-

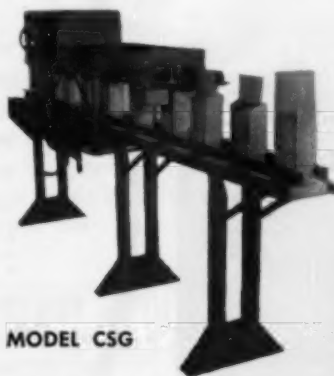
mand in neighboring countries by increasing exports. In order to secure and expand her position in this market Japan is carrying out a program of increased efficiency and capacity extension. If demand continues to grow within Asia, Japan may, as a result, take an increasingly important part in the supply of nitrogen and phosphate fertilizers to Asian countries.

The exceptional rise in consumption of nitrogen and phosphate fertilizers in China in recent years is but the beginning of a planned long-term development in that country. If present plans are fulfilled on schedule, a continuous rise in demand on the world market, for nitrogen fertilizers in particular, will have to be expected. While it is true that the Chinese chemical fertilizer industry is at present heavily involved in expansion projects, plans for the consumption of nitrogen and phosphate fertilizers far exceed targets set for production.

India has large-scale plans for

the expansion of the nitrogen and phosphate industry. The final aim is optimum self-sufficiency in these nutrients simultaneously with expanded consumption. In the next few years, however, imports will still be required. To promote the demand for and correct application of fertilizers, India and China, as well as other Asian countries, have set up extensive agricultural instruction and extension services.

Fertilizer intensity (the consumption of nutrient per hectare) varies enormously from area to area, and from one country to another. A comparison between Japanese (1955/56: 109.6 kg N per hectare arable land), India (1.0 kg) and Chinese (1956: 2.3 kg) consumption conveys some idea of the immense Asian outlet reserves for chemical fertilizers. Wide areas of America, Africa, Oceania and also of Europe have similar reserves. These facts might well be kept in mind when attempting to assess the present world fertilizer situation.★★



MODEL CSG

The FRY MODEL CSG is a semi-automatic closing machine that double-folds, heat seals the inside of the bag and glues the second fold to the first. The result is a neat closure... heat-sealed for sift-proofness and glued for additional shipping or carrying strength. Operation is continuous and no reciprocating or cyclic motions are employed.

Adjustable for various bag heights. Model CSG also handles non-heatsealable bags by gluing folds.

FRY
SEALER-
GLUER
BAG CLOSING

Machine

Ideal for

- INSECTICIDES
- FERTILIZERS
- CHEMICALS
- PLANT FOODS
- BRIQUETS
- MISCELLANEOUS POWDERS
- GRANULAR PRODUCTS

Write for informative folder on this and other models. Please submit bag and product samples.

GEORGE H. FRY COMPANY

42 EAST SECOND ST., MINEOLA, N.Y.

TEL. Pioneer
6-6230

TYPE-41

KAOLIN CLAY

For Use in Extending Insecticidal Materials

- Non-Abrasive
- Small Particle Size
- Chemically Adaptable
- Good Adhesive Qualities

For information and samples, write:

**SOUTHEASTERN
CLAY COMPANY**

AIKEN, SOUTH CAROLINA

Spray Nozzle Reference Data / *Yours FOR THE ASKING*

TEEJET SPRAY NOZZLES
with choice of over four hundred interchangeable orifice tips. Every type of spray pattern. Write for Catalog 30.

TEEVALVE
selector valve for booms with spray selection in shut-off position. Write for Bulletin 84.

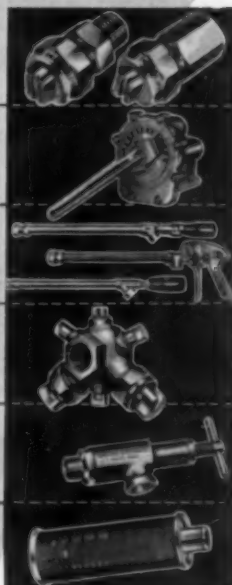
GUNJET SPRAY GUNS
for pressures up to 800 p.s.i. Interchangeable tips for every use. Bulletins 65, 69 and 80.

BOOMJET SPRAY NOZZLES
spray up to 66 feet wide for broadcast spraying with one nozzle. Bulletins 66 and 71.

PRESSURE RELIEF VALVES
dual spring assembly for low and high pressures... write for Bulletin 83.

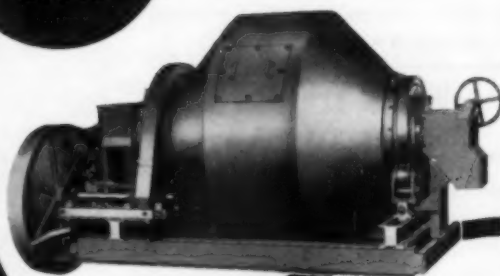
SUCTION STRAINERS
withdraw liquid within 1" of drum bottom. Write for Bulletin 85.

AND FOR ACCESSORIES OF ALL KINDS—CATALOG 30.
SPRAYING SYSTEMS CO., 3230 Randolph St., Bellwood, Ill.



MUNSON ROTARY BATCH MIXER

Here's why more and more
MUNSONS are doing the
important mixing jobs



20 TO 250 CU. FT.
MIXING CAPACITY

• Munson Mixers will quickly blend various chemical compounds into a homogeneous, accurate mixture, with no reduction in particle sizes • They blend powders and granules • Spray pipes may be installed to spray liquids on dust and granular materials • Equipped with internal vent pipe to expel toxic fumes • Drum may be heated or cooled • Granular fertilizers can be coated with insecticide dust • Will blend chemicals, fertilizers, insecticides, herbicides, antibiotics, and many other materials • Available in several models... flexible design to meet your requirements • Low horsepower... lower operating cost

TELL US YOUR MIXING PROBLEMS... write or phone for the complete story on Munson Rotary Batch Mixers.

MUNSON MILL MACHINERY COMPANY

Dept. A-1157, 210 Seward Avenue, Utica, New York

MUNSON

AGRICULTURAL CHEMICALS

BEAN CATERPILLAR

(From Page 60)

tions throughout the State and populations were light in lima, and snap beans in southern Kent and Sussex Counties. Damage by the pest was also reported from Maryland, which is very unusual. Soybeans were infested in Prince Georges and St. Marys Counties with controls being applied in the former. Local infestations on soybeans were reported from both North and South Carolina, while in Georgia alfalfa and velvetbeans were also damaged. Populations up to 150 velvetbean caterpillars per 100 sweeps of a net were recorded from alfalfa in Tensas Parish, Louisiana. The insect was also reported from soybeans in several other Louisiana Parishes.

Although the spotted alfalfa aphid has not been as spectacular this year as in previous years, the pest has continued to show some spread. In California, the insect was taken in Siskiyou County which is a new county record. Populations in 18 California counties reporting were from light to severe, but generally lighter than last year. In the Yerington, Nevada, area, populations were above last season and controls were necessary. Brookings County, South Dakota, was reported infested for the first time and in Indiana the pest had moved eastward to the Ohio line. New Indiana county records include Switzerland, Ohio, Dearborn and Sullivan Counties.★★

WACA MEETING

(From Page 82)

\$100-300 (\$80.00 to weed a field once); sugar-beets, \$30-65; onions, \$100; ornamentals, cut flowers, flowers for seed, \$200; primroses, \$450.

Potential users of vegetation control materials will require larger volumes of product than agricultural users. This problem is a prime one with railroads, utility districts; telephone and telegraph companies, and fire districts. These are all potential purchasers of herbicides; as are irrigation and drainage districts;

landscape and park superintendents. Federal agencies (Soil Conservation Service, Bureau of Land Management, Army, Navy, etc.) have charge of 40% of California's land area.

"Low prices on some chemicals can be a trap for both the chemical company and consumer. It is not good for any of those involved when there is no profit; then the end user cannot be properly serviced, and there will be no future herbicides from research. The grower should realize that he is buying herbicides to kill weeds, and not to save dollars on cost of the product.

In conclusion, Mr. Harvey made the following pointss "There is a definite need for agricultural chemical products; but it is necessary to know the product adequately, which includes knowing what it will do, and what it won't do. There is great need for trained plant scientists (not entomologists) to carry out weed control research. It is important to have more thorough testing of products under Western conditions. A great need for knowledge of moisture-relationship situations. In California, the climate is fairly constant; and moisture can be provided as desired. If a product is used under actual farm conditions, its performance can then be better predicted. Sales programs should be set up as a) demonstration and then b) a service program."

GYPSY MOTH CONTROL

(From Page 35)

television stations of the area. A TV packet of still shots of the operation with accompanying script was distributed to 125 television stations well in advance of the opening date of the spraying. A composite radio tape was distributed to 55 radio stations, assuring complete coverage of all rural and urban audiences. In addition, 7,500 question and answer sheets were mailed to selected groups by the New York Department of Agriculture and Markets. In addition to these formal distribution methods, each of the field supervisors acted as distributing outlets and personal contacts were made

These Two Case Histories



may give you a

Clue

how to

IMPROVE DISTRIBUTION of

- Insecticides
- Fungicides
- Herbicides
- Fumigants

U. S.

UNITED STATES RUBBER Naugatuck Chemical Division

Naugatuck Chemical uses Terra-Lite vermiculite (No. 4) as a carrier for ALANAP-20G (a pre-emergence herbicide). It offers high, even absorption...formulates easily without caking or balling... gives better chemical distribution for more adequate weed control.

R

RIVERDALE CHEMICAL COMPANY

Uses Terra-Lite vermiculite (No. 4) for making 40% insecticide sold to fertilizer manufacturers. High concentration desirable for blending with fertilizers. Free-flowing vermiculite permits wider coverage of aldrin due to low density and number of particles per lb. in vermiculite.

Leading producers of agricultural chemicals endorse Terra-Lite vermiculite carriers. It cuts carrier costs, increases coverage—offers a way to save time, labor, money and develop business for your firm in the booming new granular field.

Mail coupon for free working samples and complete data showing how vermiculite will readily fit into your operations.

Terra-Lite [®] DIV.
ZONOLITE COMPANY

Terra-Lite Div., Zonolite Company,
Dept. AC-117, 135 S. LaSalle Street,
Chicago 3, Illinois

Send me FREE sample of Terra-Lite granular carrier and formulating instructions. Also send me field studies on commercial use, and address of nearest Terra-Lite plant.

Name _____
Firm _____
Address _____
City _____ Zone _____ State _____

A READY SUPPLY OF

Rotenone Resins

IS AS NEAR AS YOUR TELEPHONE

Need quality rotenone resins for garden sprays and aerosols, pet shampoos, household and plant aerosols, cattle sprays and washes? Call C. I. C. for a dependable source. You'll get rotenone resins that are brittle, crystal-clear, free from impurities... that readily dissolve in suitable solvents. Available also in oil soluble and emulsifiable concentrates.



**CHEMICAL
INSECTICIDE
CORPORATION**

30 Whitman Ave. • Metuchen, N. J. • Phone: Liberty 9-2300
Plant — Metuchen, New Jersey



GLENDON

INSECTICIDE GRADE PYROPHYLLITE


*the ideal diluent and extender
for AGRICULTURAL INSECTICIDES*

Dusts compounded with Glendon's Insecticide Grade Pyrophyllite will not absorb moisture, nor will the carrier separate from the active ingredients during storage. It holds well on plant leaves even during rain, and when dusted from the air, settles rapidly, minimizing drift.

pH 6 to 7 Wt.—30 lbs. per cu. ft.
92 to 95% will pass Aver. particle size
a 325 mesh screen below 5 microns
Non-alkaline and chemically inert

GLENDON PYROPHYLLITE COMPANY

P.O. Box 2414 Plant and Mines
Greensboro, N. C. Glendon, N. C.



Biological evaluation of insecticides
Screening of compounds for insecticidal, fungicidal, and bactericidal properties
Flavor evaluation of pesticide-treated crops
Bio-assay of insecticide residues on crops
Chemical determination of insecticides
Pharmacology including warm-blooded toxicity studies
Warfarin assays — physico-chemical and biological
Other biological, chemical and microbiological services

**PROJECT RESEARCH
AND CONSULTATION**
Write for Price Schedule

**WISCONSIN
ALUMNI
RESEARCH
FOUNDATION**

P.O. BOX 2217 • MADISON 1, WIS.

MONTROSE

CHEMICAL COMPANY
of California

DDT

Technical

ALL FORMS

SALES AGENTS

R. W. GREEFF & CO., INC.

10 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
1721 TRIBUNE TOWER, CHICAGO, ILLINOIS

constantly prior to and during the program. Every principal metropolitan newspaper and almost all principal rural papers announced the program prominently.

On the ground, the press contacts released daily bulletins on the operation to local and metropolitan newspapers whenever a new area was to be sprayed. The voluminous file of clippings which has been collected by the Plant Pest Control Division attests to the full coverage which was given by radio, newspaper and television during the season. By and large, the greatest majority of the articles were factual and presented the operation in a favorable way, especially in those areas which were being sprayed.

It is indeed unfortunate that in programs of this kind it is necessary to treat marginal areas containing only a scattering of small infestations that have not multiplied to the point where damage can be observed or felt easily. Under such circumstances it is difficult, at best, for people to understand the problem and the long range benefit to them in the eradication of such a pest. On the other hand, control programs in Massachusetts, for example, are met with enthusiasm, as householders throughout the infested area have been familiar with the problem for years and are appreciative of any relief they can get. A continuous history of gypsy moth damage throughout much of New England makes it unnecessary to "sell" a program of this type. Along the edges of the infestation, where eradication must begin, there has been no such experience of damage and it is difficult for the local people to understand the basic reasons underlying the action of the agencies responsible for the program. Experience has shown, however, that given a few years to become firmly established in fringe areas, the gypsy moth will build up to serious proportions and become equally devastating as it is in many places in New England. If the seriousness of the potential situation in current spray areas in the several states involved is fully appreciated and understood, as well as the need for protecting other parts

of the United States not now infested by the gypsy moth, there is every reason to believe that the program will be unanimously regarded as a worthwhile effort. It is with this hope that responsible State and Federal agencies are making their plans for the future.★★

CANKERS ON PINE

(From Page 59)

a tree to assure effective penetration of the antibiotic, the cut surface should extend to the edge or slightly beyond the lower and lateral outer limits of surface discoloration. If more than half the circumference of a trunk is affected, bark at the edge or slightly beyond the outer limits can be slit lengthwise of the trunk to avoid removal of too much bark.

Wood-rotting fungi present when dead bark was removed to prepare cankers for treatment by Acti-dione

appear to have been killed by the antibiotic. Wound surfaces, coated by a layer of pitch, have not become infected during the 3-year period following treatment. Neither have wounds become infested by bark beetles or wood-boring insects. However, if cankers are excised when insects are in flight, incorporation of an insecticide in the Acti-dione-oil formulation would be advisable.

Endomycin and calcium sulfamate were not effective for treatment of excise trunk canker wounds. Calcium sulfamate at 5% was injurious to western white pine. Moderate to severe burning affected needles on branches originating directly above the wound. This injury extended to the tops of many trees. Neither Acti-dione nor endomycin was phytotoxic to foliage of western white pine when applied to the cut surface of excise trunk canker wounds.★★

HANDBOOK OF INSECTICIDE DUST DILUENTS AND CARRIERS

THE original publication "Properties and Commercial Sources of Insecticide Dust Diluents and Carriers" prepared by T. C. Watkins and L. B. Norton of Cornell University has been brought up to date and completely revised by Drs. Weidhaas and Brann. The new edition contains commercial information as well as data obtained in research conducted at Cornell University, Ithaca, New York.

The book is bound in a flexible leatheroid cover, far handy, practical use.

TABLE OF CONTENTS

Botanicals	Vermiculite
Sulfur	Talc
Tripolite	Pyrophyllite
Diatomite	Mentmarillonsaid Group
Calcium Limes	Kaolinite Group
Magnesium Limes	Attapulgit Group
Calcites	Unidentified Clays
Dolomites	Phosphates
Gypsum	Indeterminates
Mica	Synthetics

Pospaid if check sent with order

DORLAND BOOKS
P. O. Box 31
Caldwell, N. J.

250 Pages
\$4.75 in U.S.A.
\$5.25 elsewhere

Enclosed is our check for \$4.75 (Canada and Foreign, \$5.25) covering a copy of the HANDBOOK OF INSECTICIDE DUST DILUENTS AND CARRIERS. It is understood that we may return the book within ten days for a full refund.

Name
Company
Address
City and State

PROFESSIONAL DIRECTORY

ALVIN J. COX, Ph.D.

Chemical Engineer and Chemist

(Formerly Director of Science, Government of the Philippine Islands. Retired Chief, Bureau of Chemistry, State of California, Department of Agriculture.)

ADVISER ON AGRICULTURAL CHEMICAL PROBLEMS AND INVESTIGATIONS

Consultant in reference to spray injury and damage, claims, including imports of fruits and nuts, formulas, labeling, advertising and compliance with law.

1118 Emerson Street
Palo Alto, California

FLORIDA FIELD TRIALS

Evaluations

of

Agricultural Chemicals.

DR. G. R. TOWNSEND

Box 356

Belle Glade, Florida

Sperling Laboratories

Toxicology — Pharmacology
Physiology

Frederick Sperling, Ph.D.
Formerly Pharmacologist-in-Charge
Pharmacological and Rodenticide
Laboratory

U. S. Department of Agriculture
2170 N. Glebe Rd. Arlington 7, Va.

Theodore Riedeburg Associates

Sales Consultants

and

Manufacturers' Representatives

on

Agricultural Chemicals

415 Lexington Ave.
New York 17, New York
MURRAY HILL 7-1488

FRIAR M. THOMPSON, JR.

Consultant

Specializing in insecticides,
rodenticides, fungicides, weed
controllers for industry, house-
hold, and farm.

Product formulation, testing,
labeling.

Athens, Georgia

RESEARCH, ANALYSIS CONSULTATION

Toxicology, Pharmacology, Bacteriol-
ogy, Biochemistry, Chemistry, Nutri-
tion, Radiochemistry.

New Price Schedule Available
3755 Forest Park Avenue

SCIENTIFIC ASSOCIATES

St. Louis 8, Missouri
JEFFERSON 1-5922

Chemical & Engineering Analyses, Research & Development

Agricultural Chemical Analyses.
Insecticides, Fungicides, Herbicides,
Rodenticides, Fertilizers.
Toxicology. Market Research.
Product Development.

Ask for complete details; call —
WATKINS 4-8800
or write to:

SNELL

Foster D. Snell, Inc.
29 W. 15th STREET
New York 11, N. Y.

SOIL & PLANT TESTS

SOIL FERTILITY PROBLEMS

EVALUATION OF AGRICULTURAL CHEMICALS

Dr. Wolf's Agricultural Laboratories
2620 Taylor St. Hollywood, Fla.

AC on Microfilm

All issues of AGRICUL-
TURAL CHEMICALS are
available on Microfilm.

Librarians and other interested
subscribers can contact University
Microfilms, 13 North First Street,
Ann Arbor, Mich., for price in-
formation and copies.

*Have you a service to sell?
Are you a consultant . . .
a representative?
a salesman?*

Offer your talents, your services,
your facilities in the agricultural
chemical industry's only profes-
sional directory.

Advertising rates on request.

N. Y. Phone: BARclay 7-7121
Caldwell, N. J.: CALdwell 6-5520

AGRICULTURAL CHEMICALS

P. O. Box 31 Caldwell, N. J.

this space reserved for

your advertisement

Make yourself
known throughout
the industry

CLASSIFIED ADVERTISING

Rates for classified advertisement are ten cents per word, \$2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, \$1.00 minimum. Check must accompany all classified advertisements. Address all replies to Classified Advertisements with Box Number care of AGRICULTURAL CHEMICALS, P. O. Box 31, Caldwell, N. J. Closing date: 10th of preceding month.

Help Wanted:

TECHNICAL SALES REPRESENTATIVE required for Central Eastern States. Technical training in Pathology, Entomology, and Chemistry, or the like necessary. Promotion future. Send full details Box 180, % Agricultural Chemicals.

ENTOMOLOGIST - SALESMAN — Excellent position open with new home and garden line. Experience in small package insecticide merchandising desirable. Right person can advance to permanent sales manager position. Address Box 181 % Agricultural Chemicals.

Situations Wanted:

Situation wanted with company interested in the promotion and sale of chemicals for the control of algae and rooted vegetation in lakes and ponds. Long experience with chemicals and equipment for this type of control work. Address Box 182, % Agricultural Chemicals.

Penick Display Contest

S. B. Penick & Co., New York, is conducting a contest open to all dealers selling products containing Warfarin. The winning dealer will receive a check for \$1,000.

Contest rules call for dealers to set up a Warfarin display for two weeks between November 1st and December 15th. Each dealer will submit a photograph of his display along with his entry blank, and entries will be judged by an independent, impartial panel. The contest ends November 30th. In addition to the prize for the winning dealer, Penick will award two prizes of \$500 each to distributors' salesmen—one prize to the salesman selling the winning dealer, and another prize to the salesman submitting the most dealer entries.

For Sale:

Fertilizer equipment and tornado damaged fertilizer plant at Fargo, N. D. Building has vertical columns, foundation, bin cribbing, warehouse dock. Equipment consists of drying, cooling and pelletizing drums, fans, dust collectors, Stedman mixer, I and C bagger, hopper system and scales, flowrators, bucket elevators. Keystone 150 h.p. boiler, two Tyler screens, one Link Belt vibrating screen, two pay-loaders, Yale fork lift and pellets. Acid and fuel oil tanks, several miscellaneous conveyors, 50 totally enclosed motors up to 40 h.p. Contact Ted B. Schultz, Asst. General Manager, Peavey Elevators, 809 Grain Exchange, Minneapolis 15, Minn.

FOR SALE: Baird Dryer Model D-700, 4' x 30'; Steam Tube Dryers 4' x 30, 6 x 30. Heil Dryers 8 x 24. Dewatering presses: Louisville 8-Roll 36", Davenport 1A, #2A. Ribbon Mixers 336 cu. ft. Aluminum Tank 24,000 gal.; Steel Tank 4,300 gal. to 10,000 gal. Perry Equipment Corp., 1428 N. 6th St., Phila. 22, PPa.

Powell Moves Sales Office

John Powell & Co. division of the Olin Mathieson Chemical Corp., New York, has moved its Northeast sales office in New York to 745 Fifth Avenue.

This move consolidates Powell's operations with those of Mathieson's Industrial Chemicals division, of which Powell has been a part since the first of this year.

Spencer Awarded Plaque

A bronze plaque recognizing his "contributions to and continuing interest in research" was presented last month to Kenneth A. Spencer, president of the Spencer Chemical Co., Kansas City, Mo.

The plaque was presented by Arthur Mag, secretary of the company, at ceremonies dedicating Spencer's new research center in Johnson County, Kans. The plaque was sponsored by the company's board of directors.

Harnden Addresses Rotary

R. C. Harnden, vice president of the Agricultural Chemicals Division of the Chapman Chemical Co., Memphis, Tenn., recently gave a luncheon talk on pesticides at the Rotary Club of Memphis.

He told the audience that pesticides contribute to the economic well-being of the community, they enable farmers to raise the abundance of safe foods we need today, and they are safe for users and for consumers because of the extensive research by industry before they are marketed.

"Without agricultural chemicals," he said, "we would be reduced to the status of many European and Asian countries, where the lack of a safe and abundant food supply makes it impossible for the people to enjoy a standard of living amounting to more than a struggle for bare existence."

EDITORIALS

(Continued from Page 27)

learned too often in the past that the obvious and logical course is not always the government's way.

Whatever answer may be decided upon to this question it is to be hoped that conflicting authority and jurisdiction will not result and that such regulations as it may be found necessary to set up can be kept as uniform as possible from state to state, so that marketers of these new products need not be faced with forty-eight different sets of regulations in every state in the nation.

FERTILIZER VIEWS

(From Page 55)

ing new equipment and maintaining the means for long range development and steady growth. Pricing based on hunches, emotion and misinformation, is the opposite of creative or planned pricing. Other bad practices to be shunned by progressive management, he pointed out, are: hidden concessions such as special freight allowances, unreasonably long credit terms, quality discounts and secret rebates. These and other evils only too well-known in all industries are abuses associated with "price anarchy."



• A. B. of Two Dot, Mont., writes: "My tired budget was pepped up like new again with a concentrated schedule in *Agricultural Chemicals*."



• C. D. of Black Wolf, Neb., writes: "I cured a nagging boss in only two months with *Agricultural Chemicals*."

• E. F. of Peapack, N. J., writes: "A. B. and C. D. are pikers!"



Make *Big* Profits in '57! Raise **GIANT** Budgets

(In your spare time)

By learning how to buy Advertising Space

"Giant Budgets are friendly and clean to keep around the office. If your advertising budget is small and puny—chances are it's because you haven't handled it in a way to bring results—and help it grow. (And, if you can't handle a little budget, it's a cinch the boss won't buy you a big one!)

IF YOU PICK ON IT—IT WON'T GROW!

One way an advertising space buyer picks on his budget is to cut it up in little pieces and scatter it around in every magazine that has the word "chemicals" vaguely connected with it. Or, he gets on the right track and concentrates in one magazine—but picks the wrong one.

HOW TO RAISE GIANT BUDGETS

Concentrate your advertising in the one strongest magazine in the field—where the customers who really count will read your sales message month after month after month. And the strongest magazine is easy to judge. Just make a check chart on all the points on which two magazines can be compared!

1. Most Editorial Material
2. Most ABC Paid Circulation
3. Most Advertising Acceptance
4. Most Readership
5. Lowest Cost Coverage
6. PRESTIGE

It only makes sense to concentrate
In the strongest book—**AGRICULTURAL CHEMICALS**

Mail this coupon NOW!

(Nothing down and 12 easy payments
of only \$160 per month)

AGRICULTURAL CHEMICALS
Leader in the Ag Chemicals Field
Caldwell, New Jersey

- ☐ Please rush information on the market and the magazine!
- ☐ Please rush rate card and contract blank!
- ☐ Please rush salesman!

Name

Company

Address



AGRICULTURAL CHEMICALS

INDEX to ADVERTISERS

African Pyrethrum Development, Inc.	Sept.
American Agricultural Chemical Co.	Oct.
American Cyanamid Co.	26
American Potash & Chemical Corp.	74
Andrews, W. R. E., Sales, Inc.	99
Armour & Co.	Aug.
Ashcraft-Wilkinson Co.	12
Atlas Powder Co.	Oct.

Bakpak Div., International	
Paper Co.	2nd Cover
Baughman Manufacturing Co.	Sept.
Bell Clay Co.	Oct.
Bemis Bros. Bag Co.	24
Berkshire Chemicals, Inc.	93
Blue Valley Equip. Mfg. & Engr. Co.	22
Bradley Pulverizer Co.	73

Chase Bag Co.	53
Chemical Insecticide Corp.	108
Chemagro Corp.	Sept.
Clark Equipment Corp.	61
Climax Molybdenum Co.	94
R. D. Cole Mfg. Co.	104
Combustion Engineering, Inc.	
Raymond Division	78
Commercial Solvents Corp.	Sept.
Continental Can Co., Shellmar	
Betner Div.	Oct.
Cox, Dr. Alvin	110

Davies Nitrate Co., Inc.	103
Davison Chemical Co., Div. of	
W. R. Grace & Co.	Oct.
Diamond Alkali Co.	92
Dorr-Oliver Co.	Oct.
Du Pont de Nemours & Co.	20
Durham Chemical Co.	Oct.
Duval Sulphur & Potash Co.	12

Eastern States Petroleum Co.	Sept.
Eastman Chemical Products, Inc.	Oct.
Escambia Chemical Corp.	55

Fairfield Chemical Div., Food	
Machinery & Chemical Co.	4th Cover

Floridin Co.	Sept.
Fluid Energy Processing &	
Equipment Co.	56
Fry Co., Geo. H.	105
Fulton Bag & Cotton Mills	63

Geigy Chemical Co.	3rd Cover
General American Transportation Corp.	97
Glendon Pyrophyllite Co.	108
Grand River Chemical Division of	
Deere & Co.	Oct.
Greeff & Co., R. W.	108
Grinnell Co.	90

Hackathorn United & Co.	64
Hercules Powder Co.	76
Hooker Electrochemical Co.	Oct.
Huber, J. M. Corp.	82

Insect Control Sales & Service	102
International Minerals & Chemical	
Corp.	10, 11

Johns-Manville Co.	80
Johnson, C. S. & Co.	101
Jay Manufacturing Co.	71

Kraft Bag Co.	47
---------------	----

Lummus Co.	Oct.
Ludlow-Saylor Wire Cloth Co.	Oct.

Magnet Cove Barium Co.	Sept.
McDermott Bros.	Oct.
Michigan Chemical Corp.	Sept.
Minerals & Chemicals Corp. of	
America	54
Monsanto Chemical Co.	25, 84, 85
Munson Mill Machinery Co.	106

National Agricultural Chemicals Assn.	Sept.
National Lime & Stone Co.	104
National Potash Co.	6
Naugatuck Chemical Division,	
U. S. Rubber Co.	Oct.
Ninol Laboratories, Inc.	15

Nitroform Agricultural Chemicals, Inc.	88
Nitrogen Div., Allied Chem. &	
Dye Corp.	Between 66, 67

Penick, S. B. & Co.	21
Phelps Dodge Refining Corp.	18
Phillips Chemical Co.	23
Potash Company of America	3
Prentiss Drug & Chemical Co.	Oct.

Raymond Bag Corp.	Oct.
Raymond Division, Combustion	
Engineering, Inc.	78
Republic Steel Corp.	110
Renneburg & Sons Co., Edw.	83
Reideburg, Theodore Associates	110
Richardson Scale Co.	48
Richfield Oil Corp.	Oct.

A. J. Sackett & Sons	58
Sinclair Chemicals, Inc.	Oct.
Snell, Foster D., Inc.	110
Sohio Chemical Co.	13
Southeastern Clay Co.	106
Southwest Potash Corp.	8
Spencer Chemical Co.	50, 51
Sperling Laboratories	110
Spraying Systems Co.	106
Standard Oil Co. (Indiana)	9
St. Regis Paper Co.	Oct.
Sturtevant Mill Corp.	98
Summit Mining Corp.	89

Tennessee Corp.	14
Texas Co.	16
Texas Gulf Sulphur Co.	Oct.
Thayer Scale Co.	100
Thompson, Friar M., Jr.	110
Townsend, Dr. G. R.	110
Tractomotive Corp.	Oct.

Union Bag-Camp Paper Co.	86
Union Carbide Chemicals Co.	Oct.
U. S. Borax & Chemical Corp.	17
U. S. Graphite Co.	Oct.
U. S. Industrial Chemical Co.	Oct.
U. S. Phosphoric Products, Div.	
Tennessee Corp.	68
U. S. Potash Co.	19

Vanderbilt Co., R. T.	91
Velsicol Chemical Corp.	4

Wisconsin Alumni Research	
Foundation	108
Dr. Wolf's Agricultural Labs.	110
Woodward & Dickerson, Inc.	102

Young Machinery Co.	Sept.
Zenolite Co.	107

TALE ENDS

WHILE as yet there seems to be no proved market for the gibberellins on any major food or fiber crop, we understand that prospects look promising for use of these new growth stimulants on cotton. In one test plot this past season it was reported that use of two-thirds of a gram per acre of a gibberellin compound resulted in an increase in yield of half a bale of cotton per acre. Quality was also reported improved, the fiber being thicker and stronger, although no longer. In another experiment ten to fifteen per cent more bolls were set than in un-

treated cotton. Prospects are also reported promising for use of the gibberellins on a commercial basis in grapes. Treated grapes were of larger size, and looser clusters were noted, contributing to reduced rot and improved sanitation, and eliminating the need for expensive hand labor and reduced yield which accompany normal girdling procedures.

AC

One way in which those in the industry can help to counteract unfavorable publicity for pesticides is by addressing

groups of civic and business leaders in their home areas. NACA has just bulletined an excellent talk by R. C. Harnden, vice-president of the Agricultural Chemicals Division of Chapman Chemical Co., Memphis, before the Memphis Rotary Club. Copies of the complete talk are available from the NACA office, and a summary appears elsewhere in this issue (See page 111). Mr. Harnden emphasized three salient points: pesticides contribute to the economic well-being of the community, they help farmers raise an abundance of high quality foods, and they are safe because of the industry's extensive research and adequate legislative controls.

AC

The world's wealthiest woman is reported buying into the fertilizer business. Doris Duke may purchase Organic Corp. of America, a firm in McKeesport, Pa., which converts garbage into fertilizer. A stockholders' meeting was scheduled to be held early in November to consider transfer of the company to Miss Duke.

AC

A movment is on foot, we learn via the grapevine, to request Food and Drug to establish a tolerance for malathion and methoxychlor in milk, something along the order of one or two parts per million. First step will be the appointment of a committee to go into the matter and possibly to make such a recommendation if it is found to be justified. Members would include representatives of the USDA and of industry. Some workable tolerance will have to be allowed if dairy men are not to be denied the protection of these valuable pesticides for their herds.

AC

The U.S.D.A. is preparing to lower the boom on marketers of pesticides who persist in suggesting on labels that the formulas for their products or the products themselves have government endorsement. Such claims as "formula recommended by U.S.D.A." or "active ingredients recommended by U.S.D.A." are what the department is aiming at. No such label implying government endorsement will be registered in the future, although U.S.D.A. it is understood, will allow a grace period giving packagers an opportunity to remove offending products from the market in orderly fashion.

AC

A prominent feature in this issue is a listing of new equipment for use in fertilizer and insecticide plants that has been brought on the market within the past year. We undertook the job of compiling the information with some misgivings, for it is very difficult to do a complete job. We have the feeling that most of the correspondence to follow will consist of letters expressing surprise that we failed to list this or that company under some item of equipment. For any errors or omissions we apologize in advance. And if you find that you should have been listed, but were not, we shall be happy to add necessary details another year. No one has been knowingly omitted. And please, no indignant letters.

Get The Jump on Competition



YES, you have to call early and often to keep ahead of your competition. And one good way to increase the effectiveness of your sales calls is to back up your salesmen with a strong advertising campaign in the leading magazine in your field. The stronest magazine in the agricultural chemical field is, of course.

AGRICULTURAL CHEMICALS

Caldwell

New Jersey

Member Audit Bureau of Circulations

You sell
more

with the
Geigy
Big

4

GEIGY
AGRICULTURAL
CHEMICALS

Division of Geigy Chemical Corporation

SAW MILL RIVER ROAD
AROSLEY, NEW YORK

ORIGINATORS OF



DDT INSECTICIDES

"SEQUESTRENE" is the brand name for metal chelates sold by GEIGY AGRICULTURAL CHEMICALS, division of Geigy Chemical Corporation.

DIAZINON

FORMULATIONS

GEIGY DIAZINON is one of the most effective and economical residual fly control chemicals available. Because of its long residual action, only 2 or 3 residual sprays are required to control flies in dairy barns for an entire season. DIAZINON is now recommended for control of most insect pests of apples, pears and cherries, and post-harvest treatment of strawberry plants.



SEQUESTRENE

METAL CHELATES



SEQUESTRENE iron chelates are the original metal chelates in the field of agriculture. They are designed for the correction of iron deficiency (chlorosis) in ornamentals, fruit trees, vegetables and turf. SEQUESTRENE chelates may be applied as soil applications or foliage sprays. Completely water soluble and compatible with fertilizers and most commonly used pesticides, SEQUESTRENE iron chelates are available for use on both acid and alkaline soils.

CHLOROBENZILATE

FORMULATIONS

GEIGY CHLOROBENZILATE is a safe, effective miticide for control of various species of mites on apples, pears, azaleas, holly, spruce, and other ornamental and agricultural crops. In addition to being safe to humans, it is relatively non-toxic to bees in field applications. It has long residual action and is compatible with most commonly used insecticides and fungicides.



METHOXYCHLOR

FORMULATIONS



GEIGY METHOXYCHLOR is the "general purpose" insecticide for control of plum curculio, grape berry moth, cucumber beetle, leafhoppers, and many other insects attacking fruit, vegetables and forage crops. Residual sprays applied to empty grain bins are effective in controlling many insect pests of stored grain. Direct applications to livestock are effective in controlling horn flies, lice and ticks.

Another "first" for Fairfield...

MIGHTY MIDGET AEROSOLS



Clothing, luggage and sports equipment, courtesy Abercrombie & Fitch Co.



Now you can offer your customers a 2-oz. bomb that will do the work of a regular 12-oz. aerosol. It will cover the same area, too—because each particle of spray is 6 times more potent . . . in knockdown . . . and in kill.

The valve is metered to release 100 mg. of spray each time it is activated. This insures proper application, neither too much spray nor too little.

Although "mighty midgets" represent higher concentrations, they cost less than conventional aerosols of equal killing power. They exhibit no greater staining characteristics either. The reason is obvious: the single active ingredient is Improved Pyrenone*. And, of course, when used as

*Reg. U. S. Pat. Off., FMC

directed Pyrenone is *nontoxic*.

These miniature bombs will find many uses at the consumer level . . . in the home . . . and away from home. They'll point the way to new markets, bigger profits.

And remember, "mighty midgets" not only save metal and freon, but they save shelf space, too—cut way down on shipping costs.

Write Fairfield Chemical Division, Food Machinery and Chemical Corporation, 441 Lexington Avenue, New York 17. Branches in principal cities. In Canada: Natural Products Corporation, Toronto and Montreal.

Improved

Pyrenone



OTHER FMC CHEMICAL DIVISIONS: WESTVACO CHLOR-ALKALI Alkalies, Chlorinated Chemicals, Carbon Bisulfide
WESTVACO MINERAL PRODUCTS Phosphates, Barium and Magnesium Chemicals • BECCO CHEMICAL Peroxygen Chemicals
NIAGARA CHEMICAL Insecticides, Fungicides and Industrial Sulphur • OHIO-APEX Plasticizers and Resins • FMC ORGANIC CHEMICALS

